2012 - JCR Evaluation Form

SPECIES: Elk
PERIOD: 6/1/2012 - 5/31/2013

HERD: EL531 - IRON MOUNTAIN

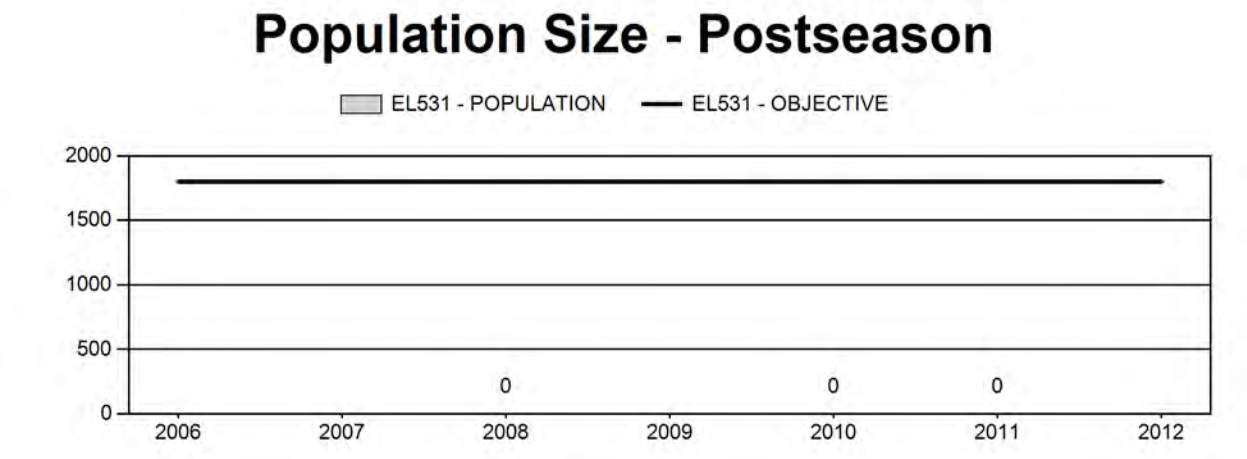
HUNT AREAS: 5-6
PREPARED BY: LEE KNOX

	2007 - 2011 Average	2012	2013 Proposed
Population:	0	N/A	N/A
Harvest:	508	1,281	1,400
Hunters:	867	2,387	2,200
Hunter Success:	59%	54%	64%
Active Licenses:	900	2,480	2,300
Active License Percent:	56%	52%	61%
Recreation Days:	5,605	13,206	13,000
Days Per Animal:	11.0	10.3	9.3
Males per 100 Females	18	50	
Juveniles per 100 Females	47	44	

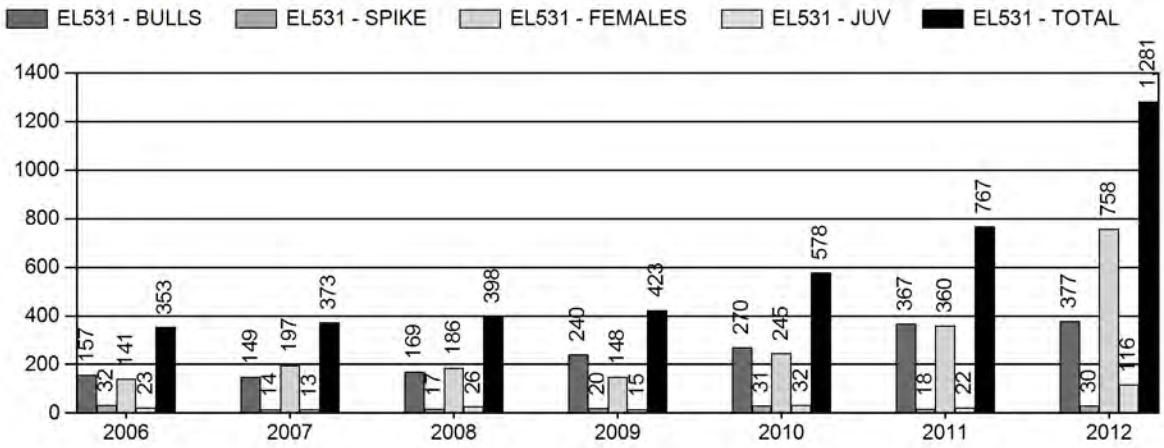
Population Objective:	1,800
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	N/A%
Number of years population has been + or - objective in recent trend:	15
Model Date:	None

Proposed harvest rates (percent of pre-season estimate for each sex/age group):

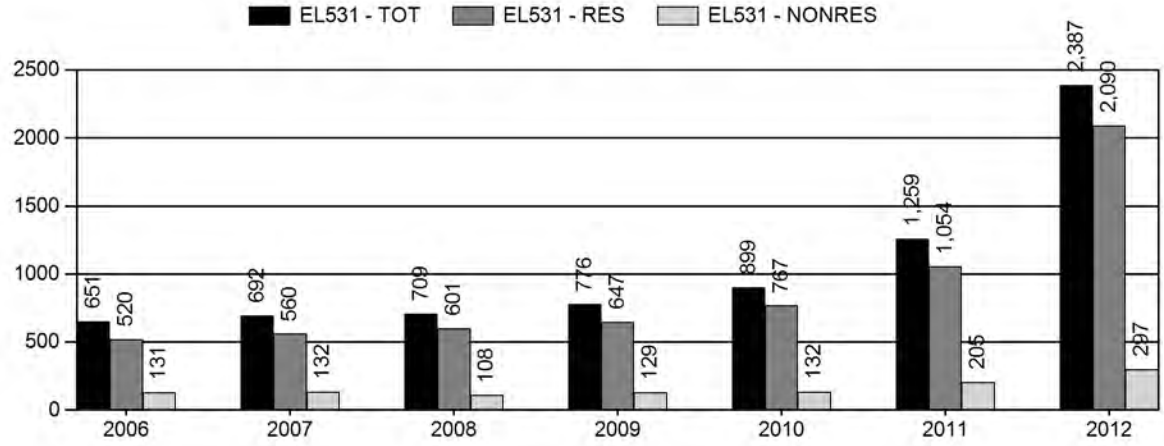
	JCR Year	Proposed
Females ≥ 1 year old:	0%	0%
Males ≥ 1 year old:	0%	0%
Juveniles (< 1 year old):	0%	0%
Total:	0%	0%
Proposed change in post-season population:	0%	0%



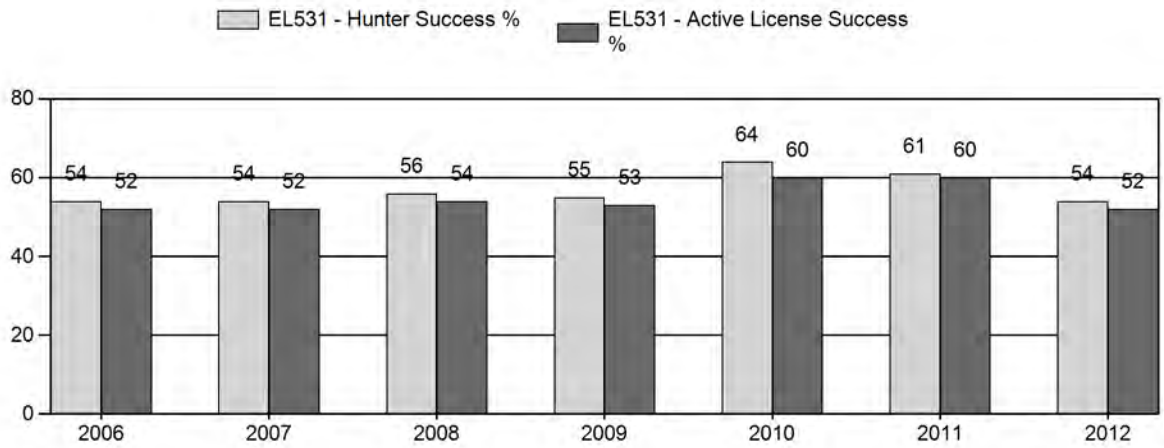
Harvest



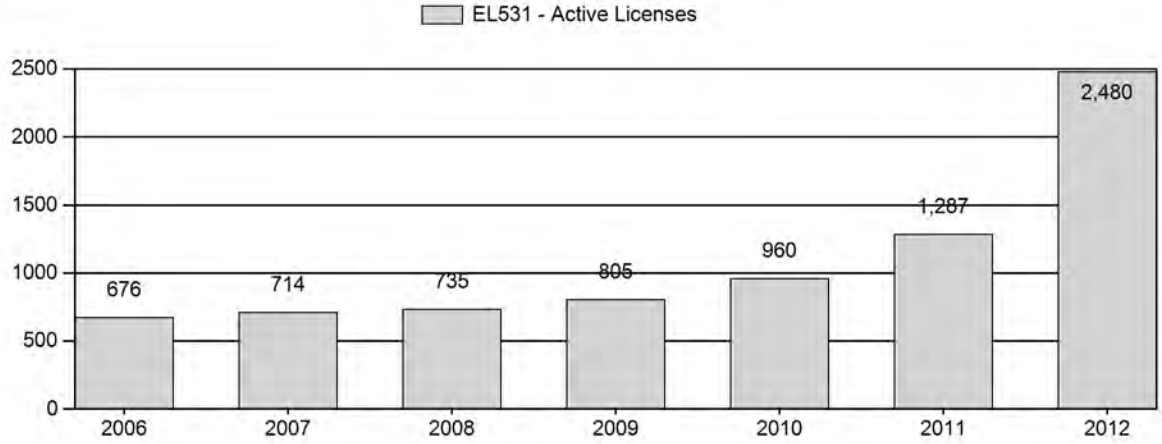
Number of Hunters



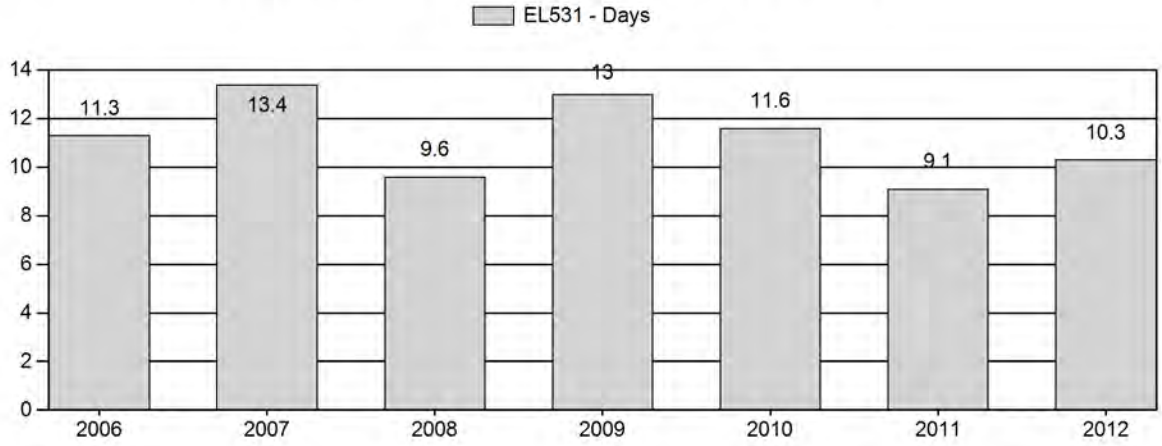
Harvest Success



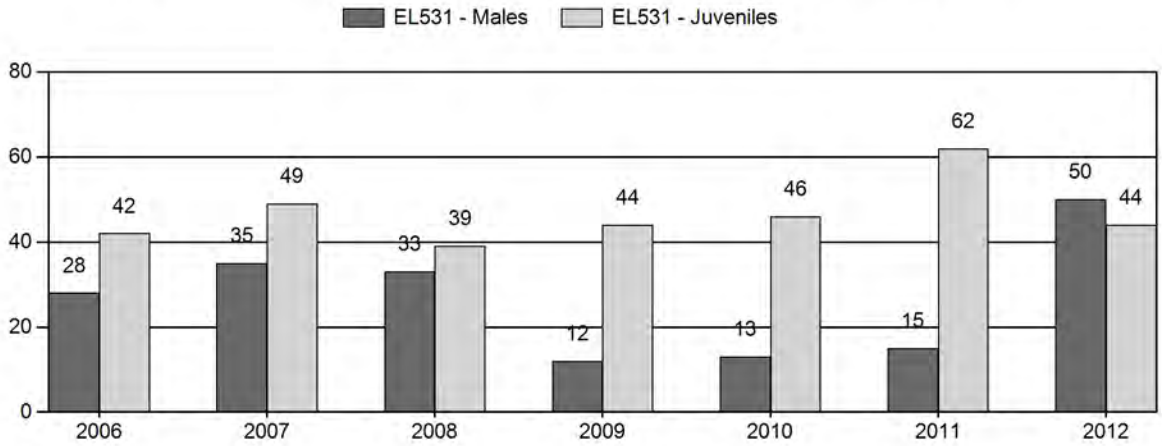
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2006 - 2012 Postseason Classification Summary

for Mule Deer Herd MD539 - SHEEP MOUNTAIN

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Yling	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2006	13,559	64	116	180	16%	575	51%	368	33%	1,123	1,233	11	20	31	± 3	64	± 5	49
2007	11,425	76	147	223	15%	754	52%	472	33%	1,449	1,162	10	19	30	± 3	63	± 4	48
2008	11,143	38	93	131	16%	441	54%	247	30%	819	993	9	21	30	± 4	56	± 5	43
2009	12,302	91	134	225	14%	843	51%	593	36%	1,661	1,391	11	16	27	± 2	70	± 4	56
2010	11,942	63	63	126	15%	474	56%	243	29%	843	840	13	13	27	± 3	51	± 5	40
2011	12,475	48	98	146	16%	480	54%	263	30%	889	1,087	10	20	30	± 4	55	± 5	42
2012	13,101	33	52	85	11%	416	55%	249	33%	750	1,047	8	12	20	± 3	60	± 6	50

2013 HUNTING SEASONS
IRON MOUNTAIN ELK (EL531)

Hunt Area	Type	Dates of Seasons Opens	Closes	Quota	Limitations
5		Oct. 1	Nov. 10	750	General license; any elk
		Nov. 11	Jan. 31		General license; antlerless elk
	6	Aug. 15	Jan. 31		Limited quota licenses; cow or calf also valid in Area 6 off national forest
6		Oct. 1	Oct. 31		General license; any elk valid off national forest
		Nov. 1	Jan. 31	100	General license; antlerless elk valid off national forest
	1	Oct.15	Oct. 31		limited quota licenses; Any elk
		Nov. 1	Jan. 31		Unused Area 6 Type 1 licenses valid for antlerless elk
	4	Nov. 1	Jan. 31	100	Limited quota licenses; antlerless elk
	6	Aug. 15	Jan. 31	750	Limited quota licenses; cow or calf off national forest; also valid in Area 5
Archery					Refer to Section 3 of this Chapter

MANAGEMENT EVALUATION

Current Postseason Population Management Objective: 1800
Management Strategy: Recreational
2012 Postseason population Estimate: ~ 2,500 – 3,500
2013 Proposed Postseason Population Estimate: ~ 2,000 – 3,000

The management objective for the Iron Mountain Elk herd is a post-season population objective of 1,800 elk. The management strategy is recreational management. The objective and management strategy were last revised in 2012.

Herd Unit Issues

The Iron Mountain Elk Herd includes Hunt Areas 5 and 6 which are composed of mostly private lands except for that portion of the Pole Mountain National Forest. The majority of land use within the Herd Unit is traditional agricultural practices. Urban sprawl has occurred in parts of Rogers canyon and in portions of Hunt Area 6 between I-80 and Wyoming Highway 287 as well as a few large stone quarries. We do not have a working population model for this herd. This herd has received low management priority in the past and classification samples sizes vary greatly. We did dedicate 4 hours of flight time to the Iron Mountain herd for 2012 to increase data sampling. However a trend count or sightabilty study is needed to give a baseline population estimate to provide a starting point for the model to run effectively. We know from harvest data as well as field personnel and landowners that the herd is above the current management objective and our field estimate is 2,500 to 3,500 elk. With the addition of a Hunter

Management and Access Program (HMAP)(Figure 1.) and the liberal season we were able to increase harvest by 166% in the Herd Unit.

Weather
Weather during 2012 and into 2013 was extremely dry and warmer than normal. The Palmer Drought Severity Index ranks drought conditions in SE Wyoming as severe and predicts conditions will continue or increase through spring of 2013. The spring and summer of 2012 was one of the driest on record leaving elk in poor body condition but the winter of 2012-2013 was mild resulting in good over winter survival. For specific weather information please refer to the following link: http://www.ncdc.noaa.gov/.

Habitat
Due to recent changes in staff habitat transects were not read in 2012. Current transects have not always been located in the best locations due to terrain or ownership status. We plan to revaluate each transect this spring to improve the quality of data being gathered. Very little to no new growth was seen due to drought conditions in the spring and summer of 2012 and Winter range conditions were sever. The reader is referred to the Strategic Habitat Plan Annual Report for further background information on shrub transects. http://www.ncdc.noaa.gov/temp-and-precip/time-series/ and
http://www.ncdc.noaa.gov/oa/climate/research/prelim/drought/pdiimage.html.

Field Data
We did not meet our classification sample for this herd. Calf ratios were 44: 100 cows which is average for this herd. Bull ratios were 77: 100 cows which is high and mostly like skewed as several large herds of cows were missed during classification flights. Hunter success was down from 60% in 2011 to 53% in 2012 for all active license types which is higher than the state wide average of 42%. Days to harvest remained at 10 days even though total number of active licenses increased from 1,000 in 2011 to 2,419 in 2012 due to the general seasons. The Hunter Satisfaction Survey showed 78% of hunters stated they were satisfied or very satisfied with their hunt with 12% remaining neutral.

Harvest Data
With the very liberal season and addition of an HMAP program harvest in 2012 increased by 166%. Teeth collected from harvested elk in this Herd Unit had a median age of 4.5 years old with the oldest elk sampled being 13.5. 2012 was the first year in more than 20 years that more cows were harvested than bulls in this Herd Unit. However with the amount of private land continued public access is critical to controlling this herd. The HMAP is planed again for the 2013 antlerless season as well as a new Hunter Management Area program in the southern portion of area 6 near the Colorado Boarder which should continue to increase harvest.

Population
We estimate from field personnel and landowners that the 2012 post season population is between 2,500 and 3,500 elk and that the population is either stable or decreasing.
We do not have a reliable model for this herd. To confound things the increase of 166% in harvest crashed the population in any model we created.

Management Summary

The 2013 season structure will result in a harvest of 1,300 elk this coming fall. In 2012 we had a liberal number of type 6 licenses as well as liberal general seasons that allowed us to increase harvest to record levels for this herd. We are still above the postseason population objective and will continue with the liberal seasons for 2013 to maintain the increase in harvest. With the current harvest through the use of PLPW programs, the HMAP and liberal seasons we will begin to bring this herd towards the objective. In Hunt Area 5 the any elk season will be shortened by 11 days to ease landowners into season lengths of 31 days and combining Hunt Areas 5 and 6 in 2014. With the shorter any elk seasons landowners are more likely to provide cow harvest opportunities earlier in the season before weather conditions prevent access. With the increase in hunting pressure in Hunt Area 6, elk used the Pole Mountain area of the National Forest as a refuge. To increase harvest and provide more public opportunity on forest the Area 6 type 4s will be valid on forest and open later in the season to coincide with the opening of the HMAP. We will open the type 6s in both Hunt Areas 5 and 6 Aug. 15th to provide a harvest tool for damage on private lands. In addition they will also be valid in both Hunt Areas to transition the combination of Hunt Areas 5 and 6 in 2014.

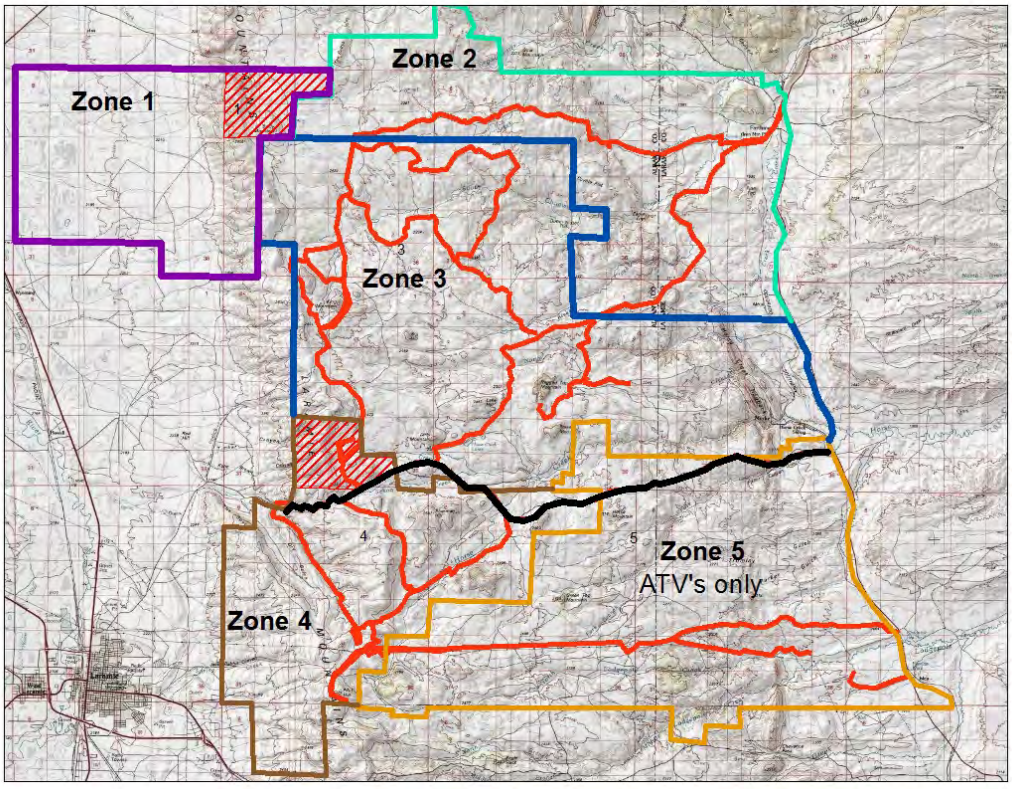
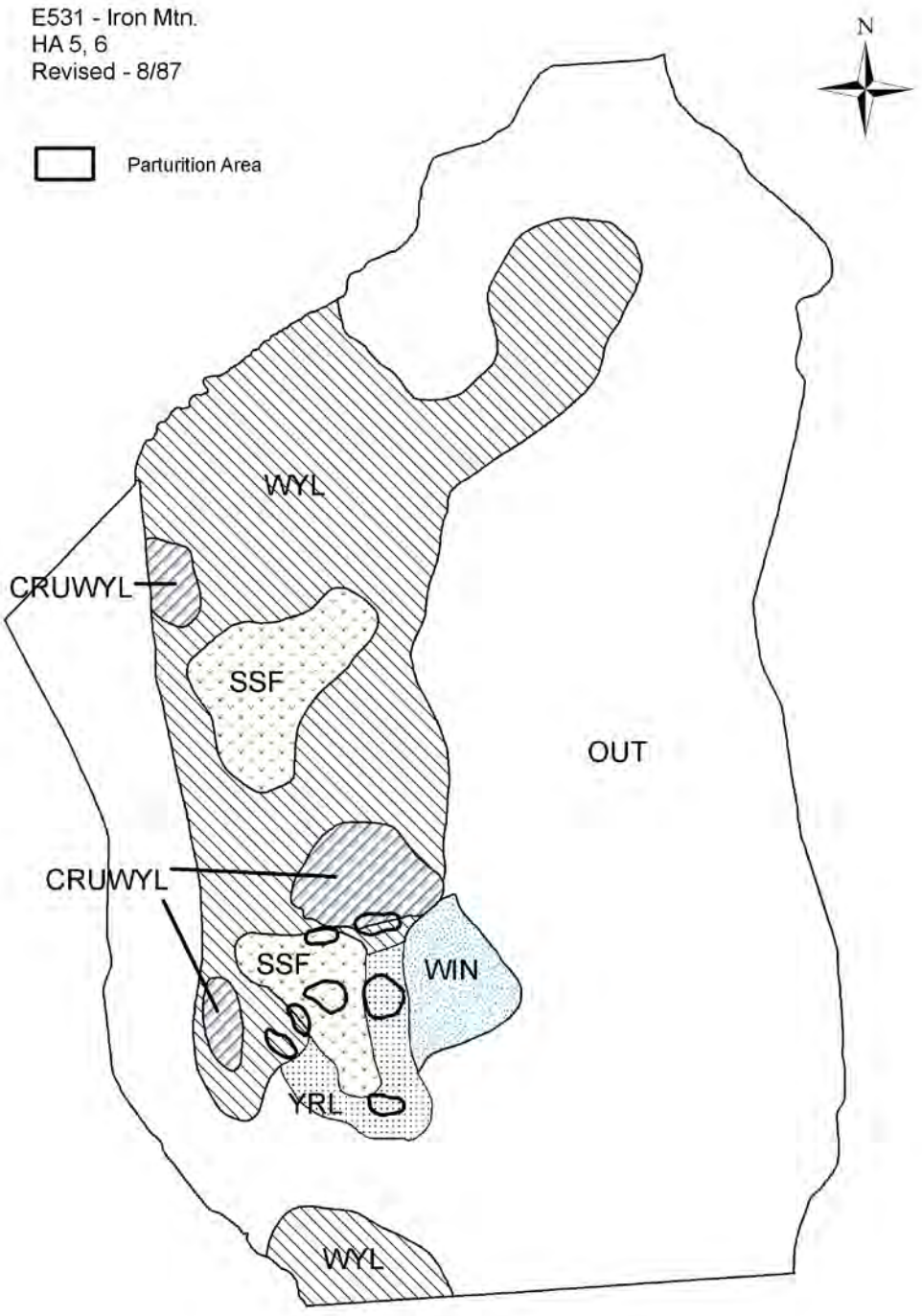


Figure 1. Map of the 2012 Hunter Management and Access Program located between Laramie and Cheyenne.


E531 - Iron Mtn.
HA 5, 6
Revised - 8/87
Parturition Area
N
WYL
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WIN
YRL
WYL

2012 - JCR Evaluation Form

SPECIES: Elk | PERIOD: 6/1/2012 - 5/31/2013

HERD: EL533 - SNOWY RANGE

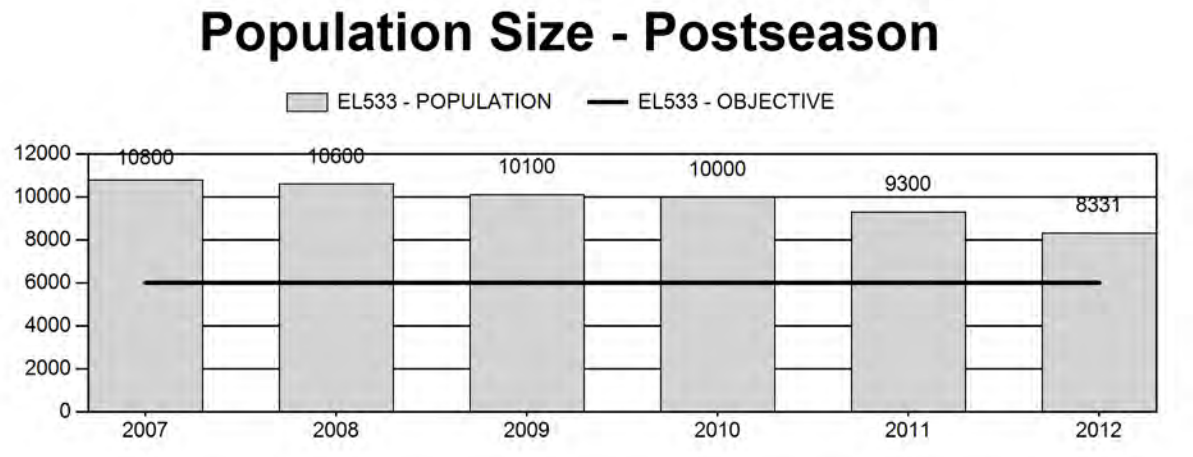
HUNT AREAS: 8-12, 110, 114, 125 | PREPARED BY: WILL SCHULTZ

	2007 - 2011 Average	2012	2013 Proposed
Population:	10,160	8,300	7,300
Harvest:	1,624	1,976	1,900
Hunters:	5,377	5,985	6,000
Hunter Success:	30%	33%	32%
Active Licenses:	5,505	6,168	6,000
Active License Percent:	30%	32%	32%
Recreation Days:	38,369	46,147	46,000
Days Per Animal:	23.6	23.4	24.2
Males per 100 Females	24	22	
Juveniles per 100 Females	45	45	

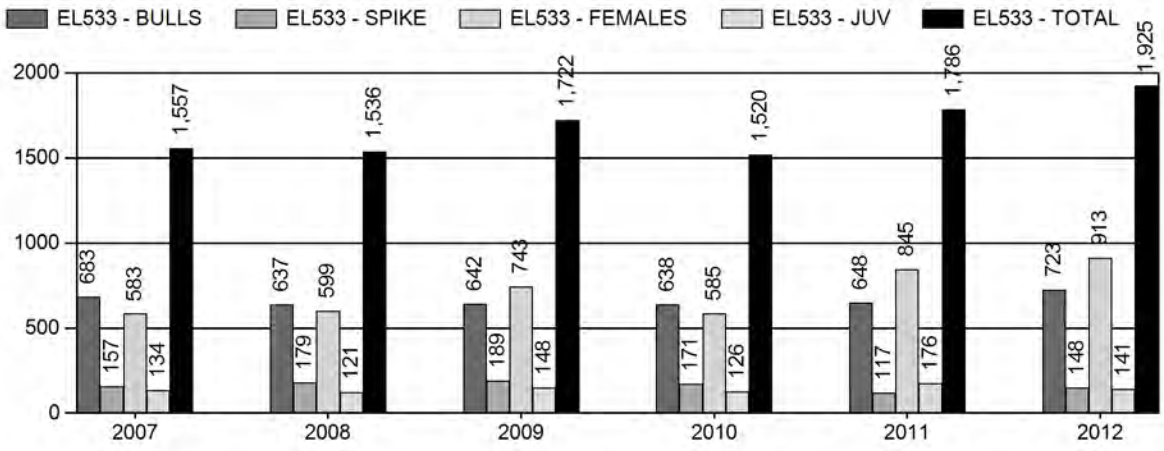
Population Objective:	6,000
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	38%
Number of years population has been + or - objective in recent trend:	20
Model Date:	03/01/2013

Proposed harvest rates (percent of pre-season estimate for each sex/age group):

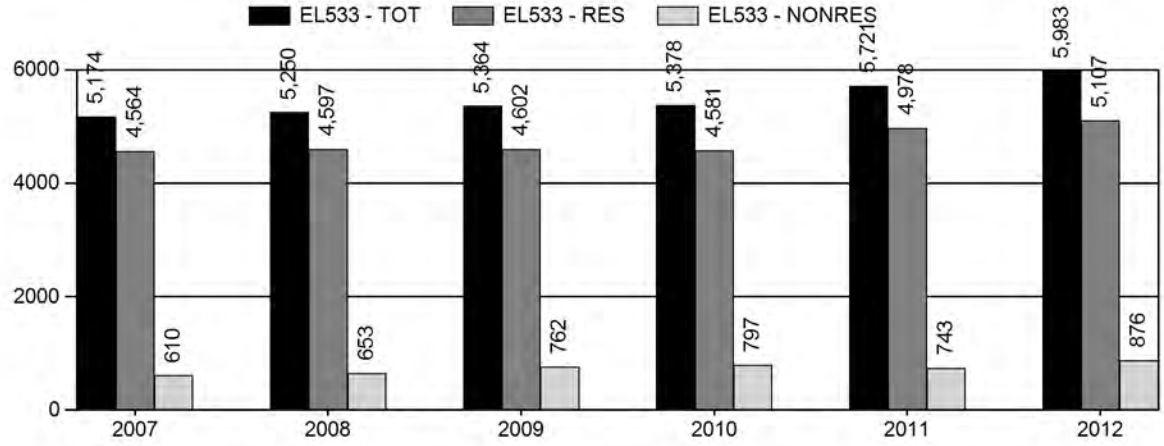
	JCR Year	Proposed
Females ≥ 1 year old:	28.0%	19.7%
Males ≥ 1 year old:	51.5%	42.9%
Juveniles (< 1 year old):	11.8%	7.2%
Total:	29.4%	22%
Proposed change in post-season population:	-32.3%	-12.0%



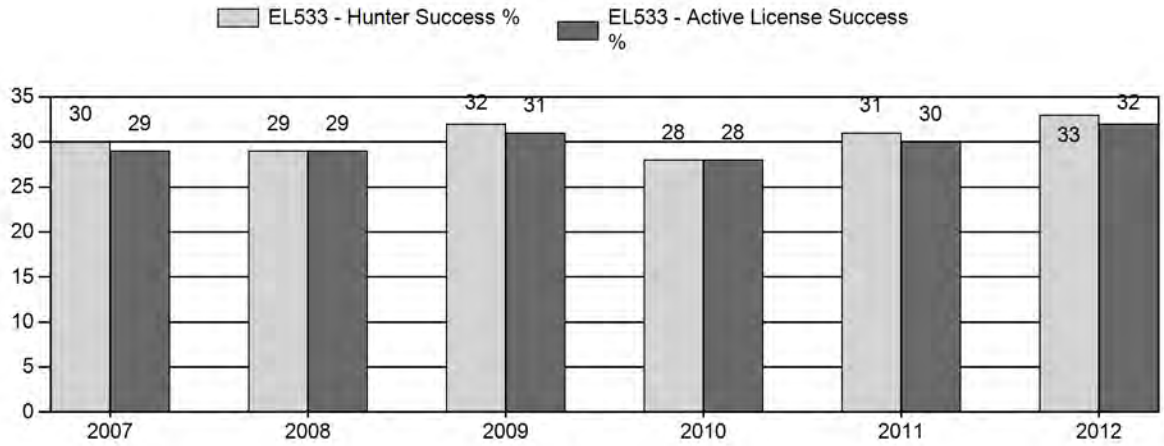
Harvest



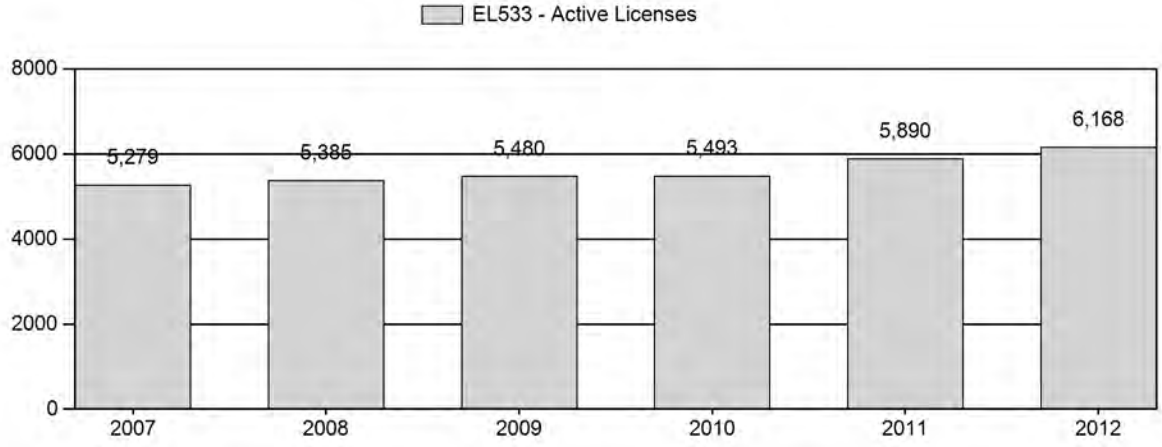
Number of Hunters



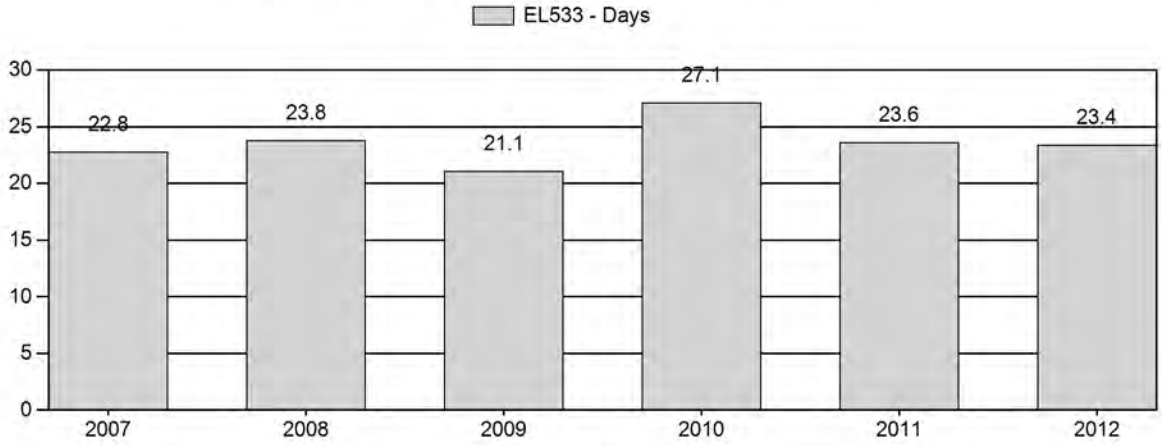
Harvest Success



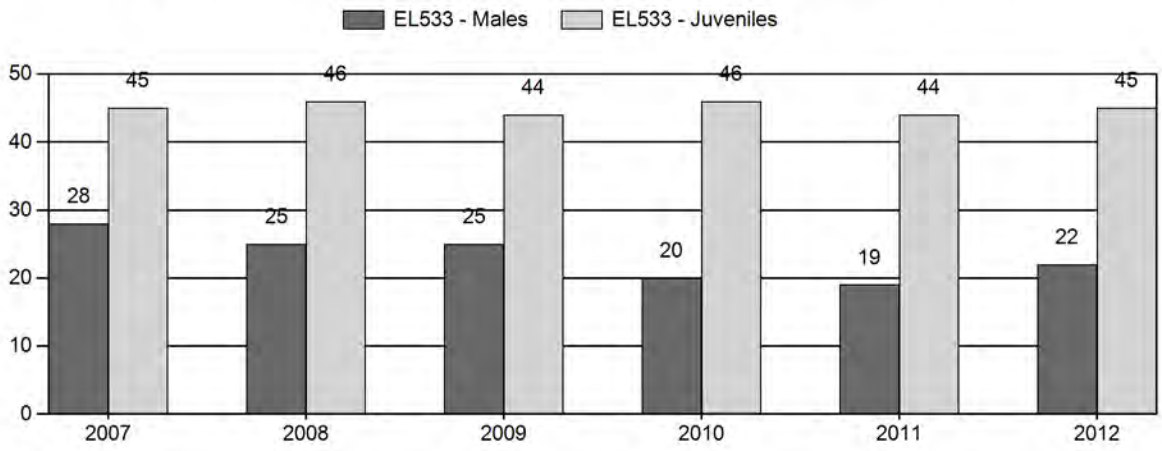
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2007 - 2012 Postseason Classification Summary

for Elk Herd EL533 - SNOWY RANGE

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2007	10,800	482	399	881	16%	3,102	58%	1,394	26%	5,377	683	16	13	28	± 1	45	± 1	35
2008	10,600	215	271	486	14%	1,980	59%	909	27%	3,375	690	11	14	25	± 1	46	± 2	37
2009	10,100	279	179	458	15%	1,816	59%	802	26%	3,076	679	15	10	25	± 1	44	± 2	35
2010	10,000	318	200	518	12%	2,633	60%	1,211	28%	4,362	650	12	8	20	± 1	46	± 2	38
2011	9,300	145	109	254	12%	1,308	61%	576	27%	2,138	639	11	8	19	± 1	44	± 2	37
2012	8,331	252	218	470	13%	2,181	60%	990	27%	3,641	0	12	10	22	± 1	45	± 2	37

Snowy Range Elk (EL533)
Hunt Areas 8, 9, 10, 11, 12, 110, 114 and 125
2013 Hunting Seasons

Hunt Area	Type	Dates of Seasons		Limited Quota	Limitations
		Opens	Closes		
8	1	Oct. 1	Oct. 31	150	Limited quota licenses; any elk
		Nov. 1	Jan. 31		Unused Area 8 Type 1 licenses valid for any elk west of Sand Creek Road (Albany County Road 34) and antlerless elk east of Sand Creek Road (Albany County Road 34)
	6	Aug. 15	Jan. 31	150	Limited quota licenses; cow or calf
9		Oct. 1	Oct. 14		General license; any elk
		Oct. 15	Oct. 31		General license; antlerless elk
	6	Aug. 15	Sep. 30	150	Limited quota licenses; cow or calf valid on private land
		Oct. 1	Dec. 31		Unused Area 9 Type 6 licenses valid in the entire area
10		Oct. 1	Oct. 14		General license; any elk
		Oct. 15	Oct. 31		General license; antlerless elk
	6	Aug. 15	Sep. 30	800	Limited quota licenses; cow or calf valid on private land
		Oct. 1	Dec. 31		Unused Area 10 Type 6 licenses valid in the entire area
11	1	Oct. 1	Oct. 31	150	Limited quota licenses; any elk
	4	Oct. 1	Oct. 31	300	Limited quota licenses; antlerless elk
	6	Aug. 15	Jan. 31	50	Limited quota licenses; cow or calf valid off national forest and off the Wyoming Game and Fish Commission's Wick Wildlife Habitat Management Area
12		Oct. 15	Oct. 31		General license; any elk; spikes excluded
	6	Oct. 1	Nov. 14	100	Limited quota licenses; cow or calf
12, 13, 15, 110	7	Aug. 15	Jan. 31	75	Limited quota licenses; cow or calf valid on private land
110		Oct. 15	Oct. 31		General license; any elk, spikes excluded
	6	Oct. 1	Nov. 14	100	Limited quota licenses; cow or calf

Hunt Area	Type	Dates of Seasons		Limited Quota	Limitations
		Opens	Closes		
114	1	Oct. 1	Oct. 31	50	Limited quota licenses; any elk
		Nov. 1	Jan. 31		Unused Area 114 Type 1 licenses valid for any elk north and west of Carbon County Road 3
	6	Aug. 15	Jan. 31	200	Limited quota licenses; cow or calf
125	1	Oct. 1	Dec. 31	175	Limited quota licenses; any elk
		Jan. 1	Jan. 31		Unused Area 125 Type 1 licenses valid for antlerless elk
	6	Oct. 1	Jan. 31	200	Limited quota licenses; cow or calf

Hunt Area	Type	Quota change from 2012
8	6	+50
9	6	+50
11	6	+25
12	6	+125
12	7	-125
110	6	+100
110	7	-200
114	1	-50
114	6	+50
125	1	+25
Herd Unit Total	**1**	**-25**
	6	**+375**
	7	**-125**

Management Evaluation

Current Management Objective: 6,000
Management Strategy: Recreational
2012 Postseason Population Estimate: 8,300
2013 Proposed Postseason Population Estimate: 7,300

Elk in The Snowy Range herd unit are managed toward a numeric objective of 6,000. The population was estimated using a spreadsheet model developed in 2012 and updated in 2013. T he herd is managed for recreation opportunity. T he objective was last reviewed in 1997.

Herd Unit Issues
The Snowy Range herd unit covers a large portion of Wyoming. Issues here include development in the form of energy, agricultural, residential, invasive and noxious plants, forestry and range management, and over use of important habitat by both sportsman and other user groups.

Weather
Weather in this herd unit was hot and dry during the past year. This weather pattern most likely had a negative influence on elk. For specific meteorological information for the Snowy Range herd unit the reviewer is referred to the National Weather Service at the following links:
http://www.ncdc.noaa.gov/temp-and-precip/time-series/
http://www.ncdc.noaa.gov/oa/climate/research/prelim/drought/pdiimage.html

Habitat
No elk habitat production/utilization data was available for this herd unit. However, production was assumed poor and utilization high.

Field Data
The postseason classification sample of 3,641 elk produced ratios of 22 bulls and 45 calves /100 cows in this herd unit (Figure 1). We classified elk from a helicopter in conjunction with local mule deer classifications. A comparison of the trend in bull ratios between general season hunt areas and limited quota hunt areas in the Snowy Range Herd Unit demonstrated the difference in ratios between the 2 hunting season strategies (Figure 2). It appeared the limited quota hunt areas "carry" the bull ratios for the entire herd unit level.

Figure 1. 2000-2012 Bull and calf ratios from the Snowy Range Elk Herd Unit, Wyoming.

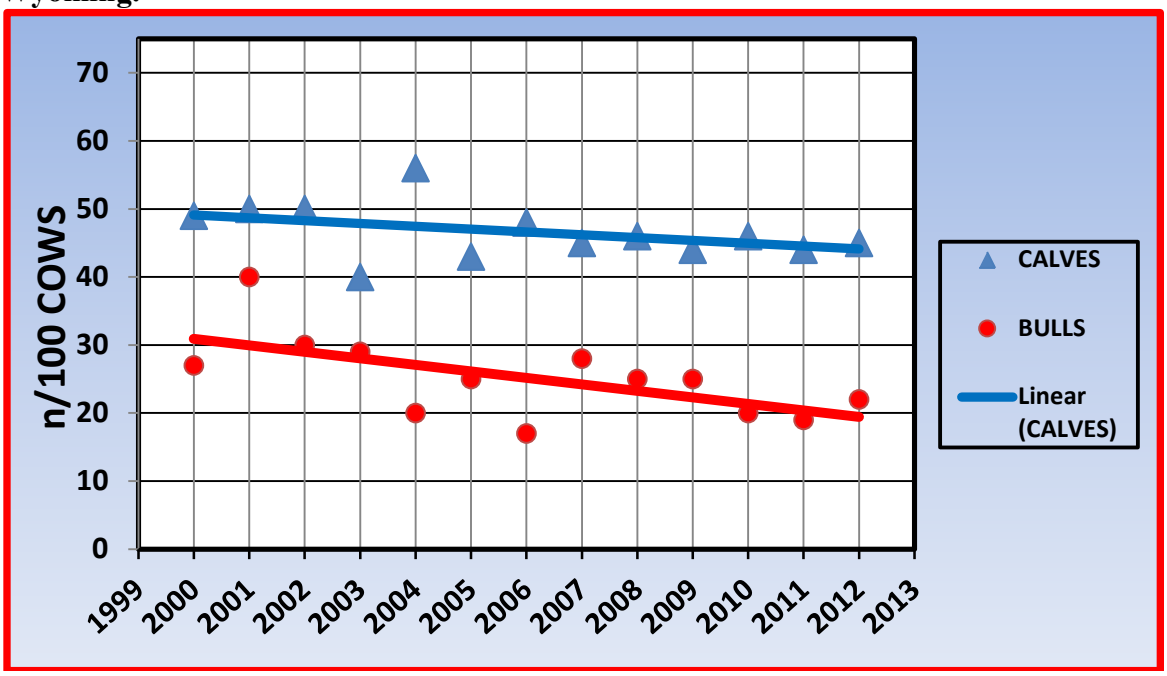
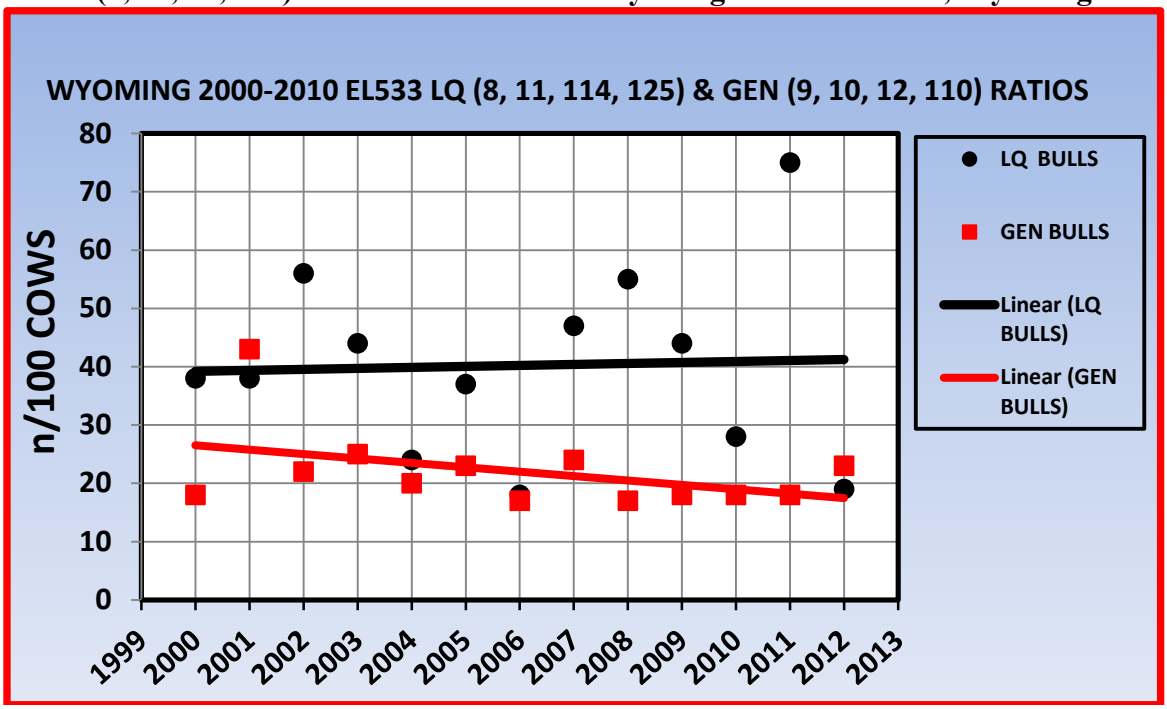


Figure 2. 2000-2012 Bull ratios from limited quota (8, 11, 114, 125) and general season (9, 10, 12, 110) Hunt Areas in the Snowy Range Elk Herd Unit, Wyoming.



Harvest Data

The 2012 preliminary harvest survey data indicated 5,985 (2% increase from 2011) active licensed hunters harvested 1,976 (5% increase from 2011), with a total harvest success rate of 33% (1% increase from 2011). Branch antlered bulls accounted for 83% of the male harvest in 2012. Antlerless elk accounted for 55% of the total 2012 elk harvest in the Snowy Range Herd Unit.

Population

The SCJ, SCA spreadsheet model was selected to model the Snowy Range Herd Unit's population dynamics because it produced the lowest Fit and AICc scores. Scores and postseason estimates were similar between the CJ,CA model and SCJ, SCA models. Without other information (e.g. an independent population estimate or survival data) for comparison, it is difficult to determine which of these 2 models produced the most accurate estimate. We consider the 2012 postseason estimate produced by the SCJ,SCA spreadsheet model to be plausible.

Management Summary

The seasons in the Snowy Range Herd Unit should continue to provide opportunities to reduce the overall elk population. Elk numbers appear to be declining towards the management objective and we may need to consider reducing antlerless harvest in the not so distant future. However, given the recent return to drought conditions, competition with other ungulates, and damage issues, we consider it prudent to continue to provide opportunities to harvest elk in this herd unit. Spikes excluded limitations in general Hunt Areas 12 and 110 in an attempt to improve future branch antlered bull ratios, which have been in decline. Future harvest opportunity for antlered elk may need to be further reduced in the general hunt areas to insure ratios do not continue to decline beyond the recreational management strategy threshold.

Bibliography of Herd Specific Studies

Reeve, A.F., F.G. Lindzey, and S.H. Anderson. 2003. Elk population in Wyoming: 1978-2001. Wyoming Cooperative Fish and Wildlife Research Unit, University of Wyoming, Laramie, Wyoming. USA. 138pp.

INPUT	
Species:	ELK
Biologist:	WILL SCHULTZ
Herd Unit & No.:	SNOWY RANGE 533
Model date:	03/01/13

☐ Clear form

MODELS SUMMARY		Fit	Relative AICc	Check best model to create report	Notes
CJ,CA	**Constant Juvenile & Adult Survival**	308	317	☐ CJ,CA Model	*Constrained CJ @ <0.95 & >0.8 and CA @ <0.98 & .0.85*
SCJ,SCA	**Semi-Constant Juvenile & Semi-Constant Adult Survival**	304	314	☑ SCJ,SCA Mod	*Constrained SCJ @ <0.95 & >0.5 and SCA @ <0.98 & .0.8*
TSJ,CA	**Time-Specific Juvenile & Constant Adult Survival**	232	375	☐ TSJ,CA Model	
TSJ,CA,MSC	**Time-Specific Juv, Constant Adult Survival, Male survival coefficient**	123	260	☐ TSJ,CA,MSC Model	

Population Estimates from Top Model

Year	Posthunt Population Est.		Trend Count	Predicted Prehunt Population				Predicted Posthunt Population				Objective
	Field Est	Field SE		Juveniles	Total Males	Females	Total	Juveniles	Total Males	Females	Total	
1993				2762	2239	6998	11998	2531	1293	6007	9830	6000
1994				3127	2077	6529	11733	3003	1336	6043	10382	6000
1995				3209	2278	6722	12209	3079	1587	6246	10912	6000
1996				3113	2540	6940	12592	2986	1939	6076	11002	6000
1997				3114	2841	6748	12704	2937	1795	5788	10520	6000
1998				3094	2688	6460	12242	2972	1920	5841	10734	6000
1999				3181	2819	6522	12521	2970	1994	5870	10834	6000
2000				3004	2887	6548	12439	2836	2244	5824	10905	6000
2001				3078	3079	6460	12616	2871	2204	5728	10803	6000
2002				3040	3052	6381	12473	2922	2257	5891	11070	6000
2003				2519	3120	6552	12191	2410	2264	5962	10636	6000
2004				3460	2953	6446	12858	3325	1973	5926	11225	6000
2005				2788	2988	6722	12497	2667	2112	6150	10929	6000
2006				3042	2896	6710	12649	2903	1945	6107	10955	6000
2007				2892	2818	6749	12459	2745	1894	6108	10747	6000
2008				2905	2717	6696	12318	2772	1819	6037	10628	6000
2009				2734	2655	6639	12028	2571	1741	5822	10134	6000
2010				2771	2514	6367	11652	2633	1624	5724	9980	6000
2011				2557	2424	6296	11276	2363	1582	5366	9312	6000
2012				2344	2293	5867	10505	2189	1319	4823	8331	6000
2013				2078	1986	5295	9359	1913	1133	4250	7296	6000
2014												6000
2015												6000
2016												6000
2017												6000
2018												6000
2019												6000
2020												6000
2021												6000
2022												6000
2023												6000
2024												6000
2025												6000

Survival and Initial Population Estimates

Year	Annual Juvenile Survival Rates			Annual Adult Survival Rates		
	Model Est	Field Est	SE	Model Est	Field Est	SE
1993	0.68			0.94		
1994	0.68			0.94		
1995	0.68			0.94		
1996	0.68			0.94		
1997	0.68			0.94		
1998	0.68			0.94		
1999	0.68			0.94		
2000	0.68			0.94		
2001	0.68			0.94		
2002	0.68			0.94		
2003	0.68			0.94		
2004	0.68			0.94		
2005	0.68			0.94		
2006	0.68			0.94		
2007	0.68			0.94		
2008	0.68			0.94		
2009	0.68			0.94		
2010	0.68			0.94		
2011	0.68			0.94		
2012	0.68			0.94		
2013	0.68			0.94		
2014						
2015						
2016						
2017						
2018						
2019						
2020						
2021						
2022						
2023						
2024						
2025						

Parameters:	Optim cells
Juvenile Survival =	0.676
Adult Survival =	0.944
Initial Total Male Pop/10,000 =	0.129
Initial Female Pop/10,000 =	0.601

MODEL ASSUMPTIONS	
Sex Ratio (% Males) =	50%
Wounding Loss (total males) =	10%
Wounding Loss (females) =	10%
Wounding Loss (juveniles) =	10%
Total Bulls Adjustment Factor	75%

Classification Counts								Harvest						
Year	Juvenile/Female Ratio			Total Male/Female Ratio									Segment Harvest Rate (% of Prehunt Segment)	
	Derived Est	Field Est	Field SE	Derived Est	Field Est w/ bull adj	Field Est w/o bull adj	Field SE	Juv	Yrl males	2+ Males	Females	Total Harvest	Total Males	Females
1993		42.13	1.87	21.52	20.61	15.46	1.02	210	249	611	901	1971	42.3	14.2
1994		49.70	2.36	22.12	24.29	18.22	1.27	113	199	474	442	1228	35.6	7.4
1995		49.30	2.21	25.40	30.69	23.02	1.37	118	206	422	433	1179	30.3	7.1
1996		49.15	1.77	31.91	30.12	22.59	1.09	115	118	428	785	1446	23.6	12.4
1997		50.75	2.76	31.01	23.13	17.35	1.42	161	266	685	873	1985	36.8	14.2
1998		50.87	2.19	32.88	29.80	22.35	1.31	111	158	540	562	1371	28.6	9.6
1999		50.59	2.23	33.96	46.80	35.10	1.76	192	203	547	592	1534	29.3	10.0
2000		48.69	2.36	38.54	35.54	26.66	1.61	153	117	467	658	1395	22.3	11.1
2001		50.13	2.54	38.48	54.00	40.50	2.21	188	165	630	665	1648	28.4	11.3
2002		49.60	2.14	38.31	40.63	30.48	1.57	107	97	626	445	1275	26.1	7.7
2003		40.43	1.90	37.97	38.78	29.09	1.54	99	149	629	536	1413	27.4	9.0
2004		56.11	2.26	33.29	27.24	20.43	1.20	122	113	778	472	1485	33.2	8.1
2005		43.37	1.64	34.34	33.68	25.26	1.17	110	190	606	520	1426	29.3	8.5
2006		47.53	2.51	31.85	22.72	17.04	1.34	127	160	705	548	1540	32.9	9.0
2007		44.94	1.45	31.02	37.87	28.40	1.08	134	157	683	583	1557	32.8	9.5
2008		45.91	1.84	30.14	32.73	24.55	1.24	121	179	637	599	1536	33.0	9.8
2009		44.16	1.87	29.91	33.63	25.22	1.32	148	189	642	743	1722	34.4	12.3
2010		45.99	1.60	28.37	26.23	19.67	0.95	126	171	638	585	1520	35.4	10.1
2011		44.04	2.20	29.49	25.89	19.42	1.33	176	117	648	845	1786	34.7	14.8
2012		45.39	1.74	27.34	28.73	21.55	1.10	141	153	733	949	1976	42.5	17.8
2013		45.00	2.55	26.66	33.33	25.00	1.77	150	75	700	950	1875	42.9	19.7
2014														
2015														
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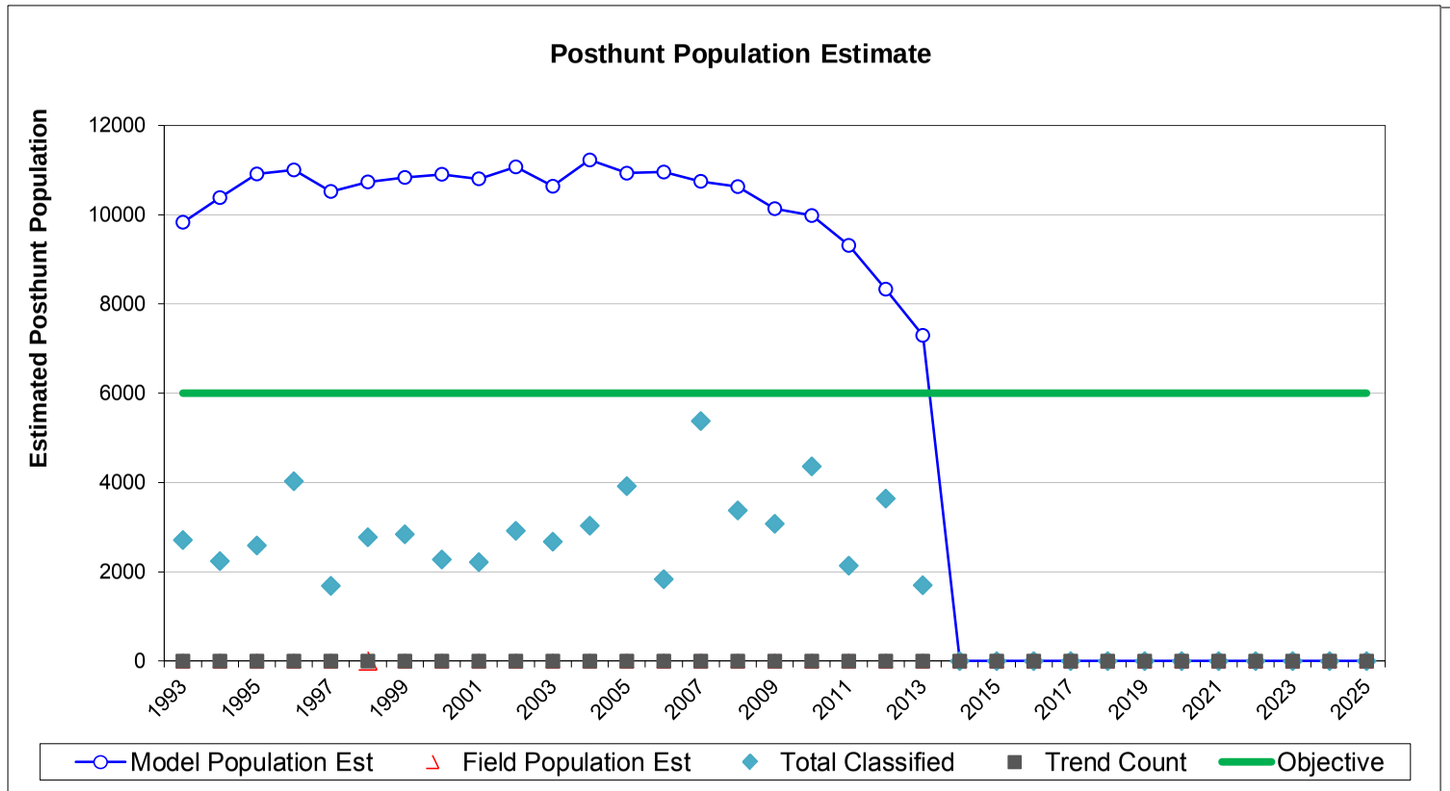
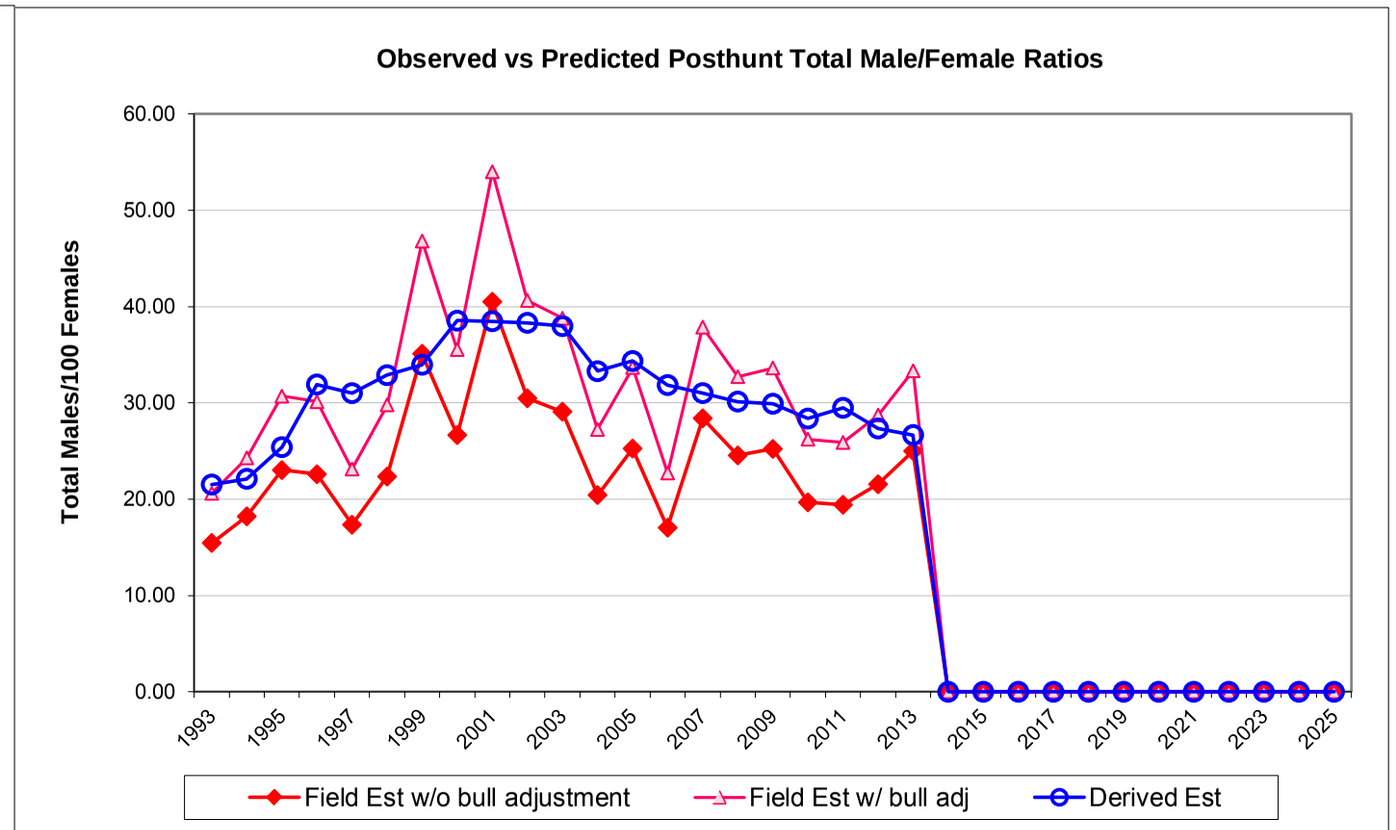
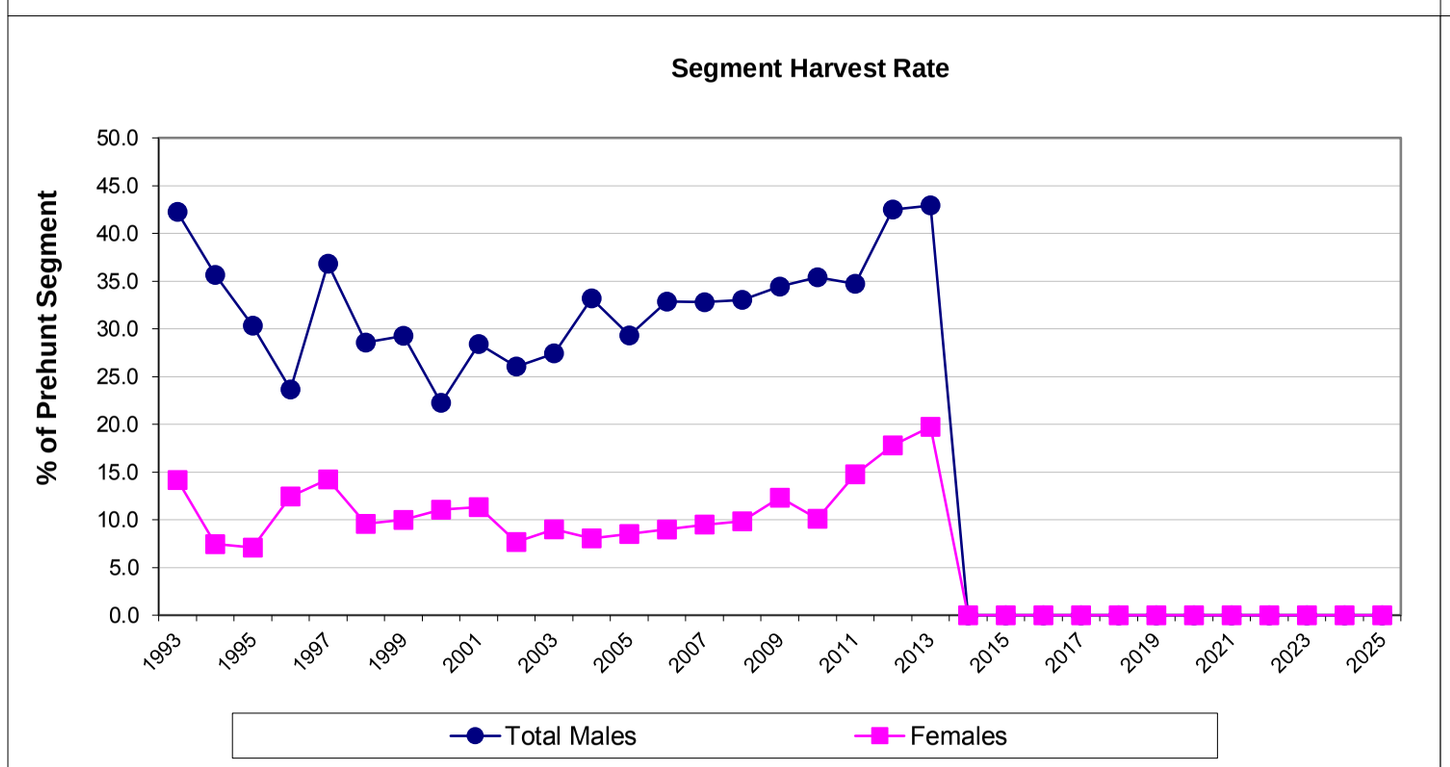
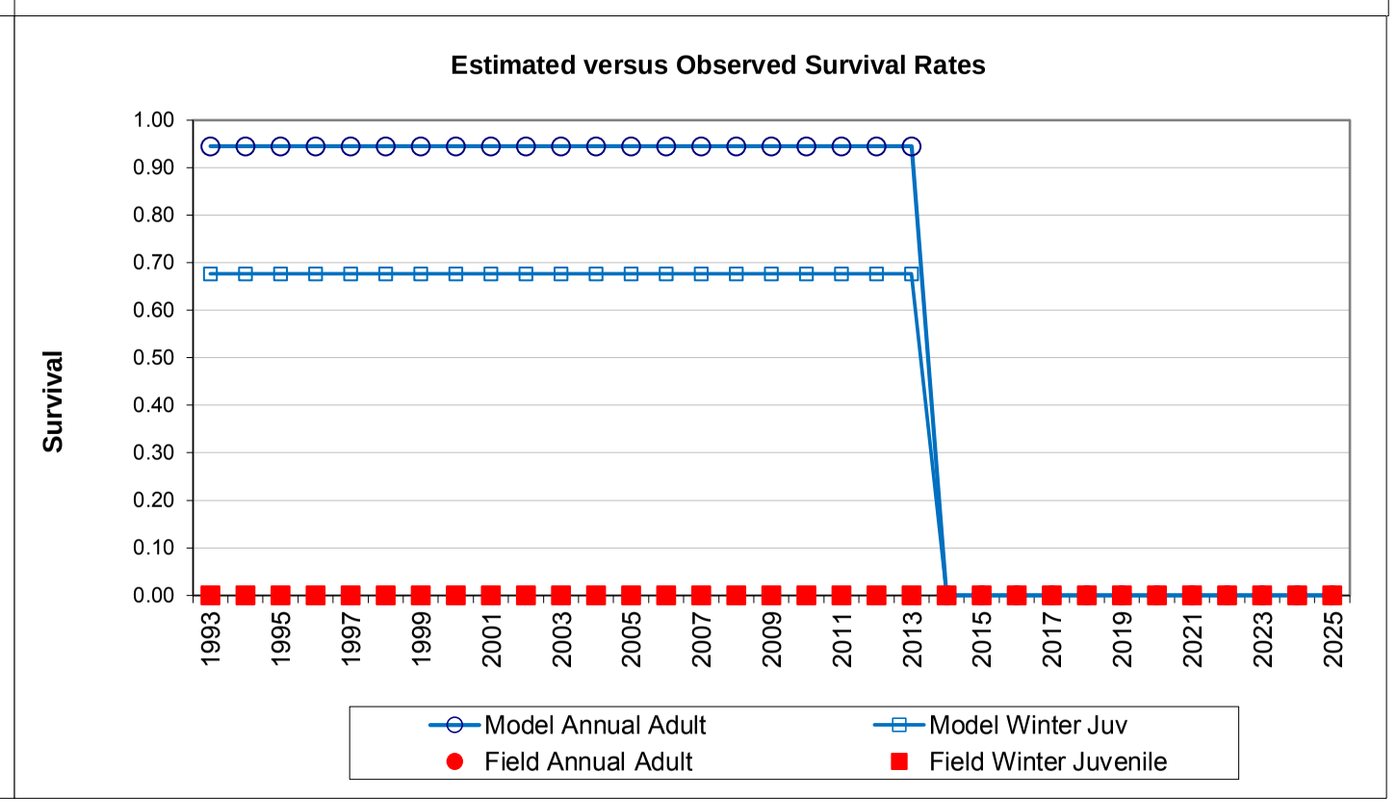
FIGURES





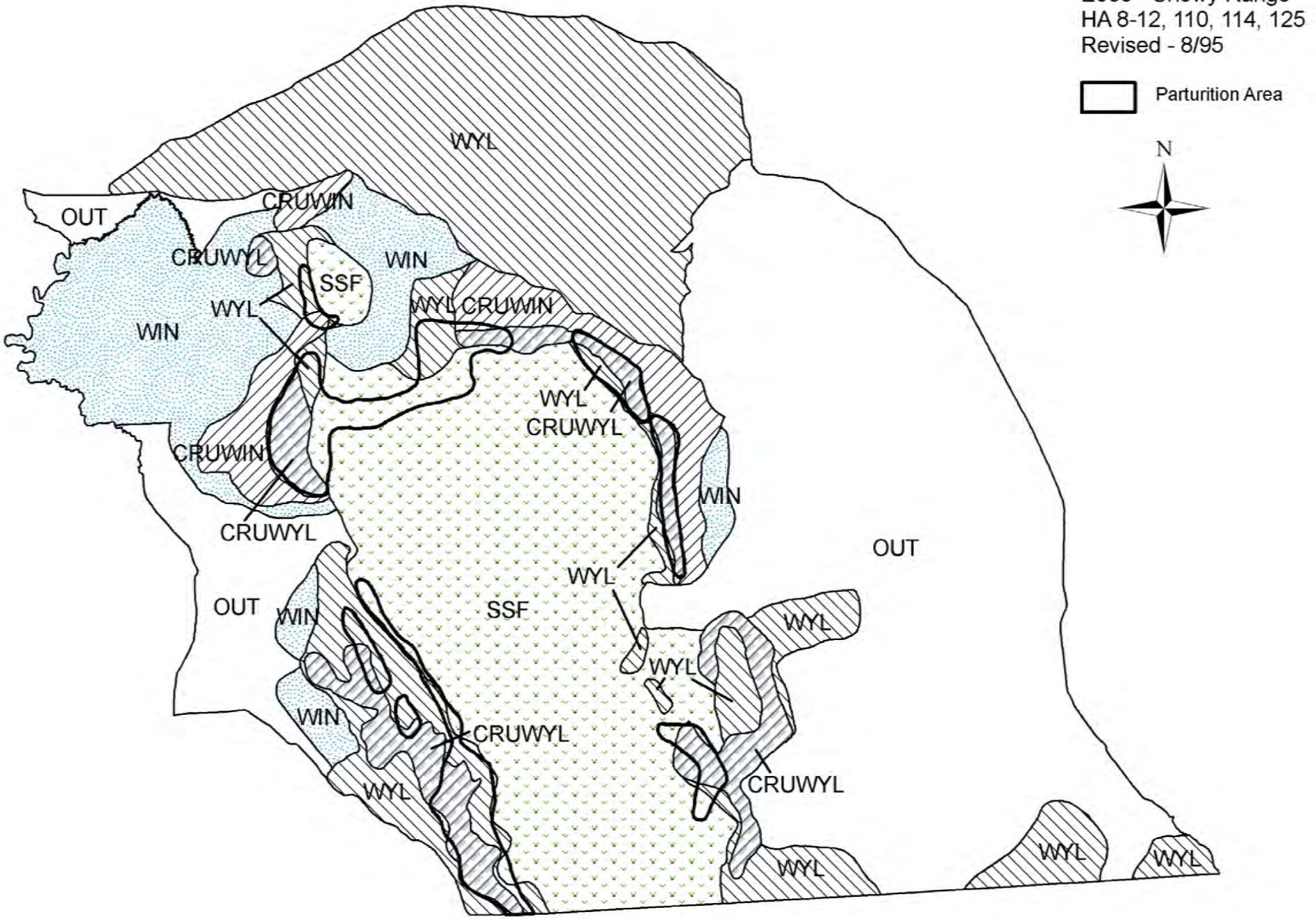




Comments:

The SCJ,SCA model was selected because it produced the lowest Fit and AICc scores. Scores and postseason estimates were similar between the CJ,CA model and SCJ,SCA models. Without other information (e.g. an independent population estimate or survival data) for comparison it is difficult to determine which of these 2 models produced the most accurate estimate. WS

END


E533 - Snowy Range
HA 8-12, 110, 114, 125
Revised - 8/95
Parturition Area
N
WYL
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CRUWIN
CRUWYL
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WYL
WYL CRUWIN
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WYL

2012 - JCR Evaluation Form

SPECIES: Elk | PERIOD: 6/1/2012 - 5/31/2013

HERD: EL534 - SHIRLEY MOUNTAIN

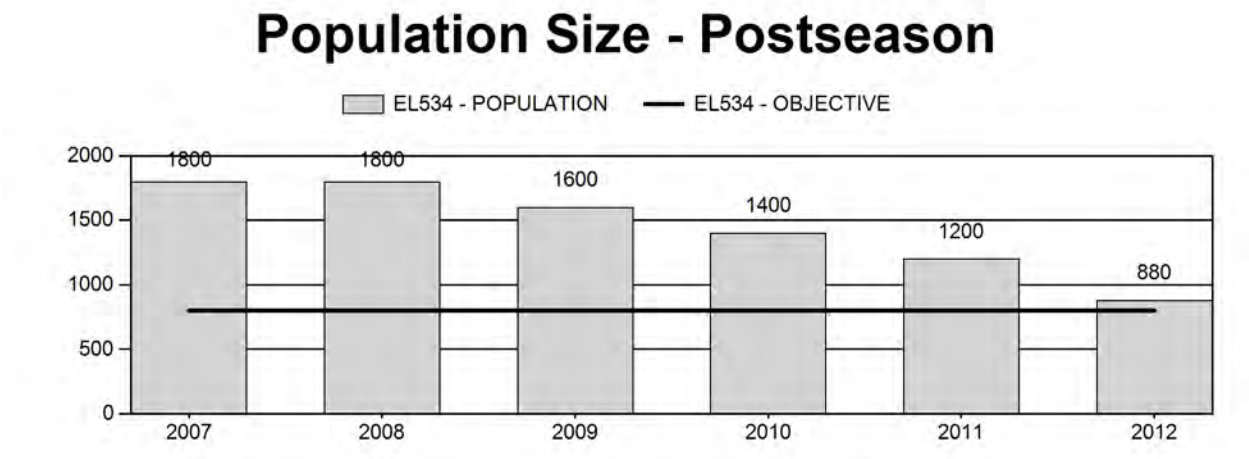
HUNT AREAS: 16 | PREPARED BY: WILL SCHULTZ

	2007 - 2011 Average	2012	2013 Proposed
Population:	1,560	880	600
Harvest:	298	378	320
Hunters:	566	596	700
Hunter Success:	53%	63%	46%
Active Licenses:	586	627	700
Active License Percent:	51%	60%	46%
Recreation Days:	3,924	5,572	4,300
Days Per Animal:	13.2	14.7	13.4
Males per 100 Females	34	49	
Juveniles per 100 Females	44	65	

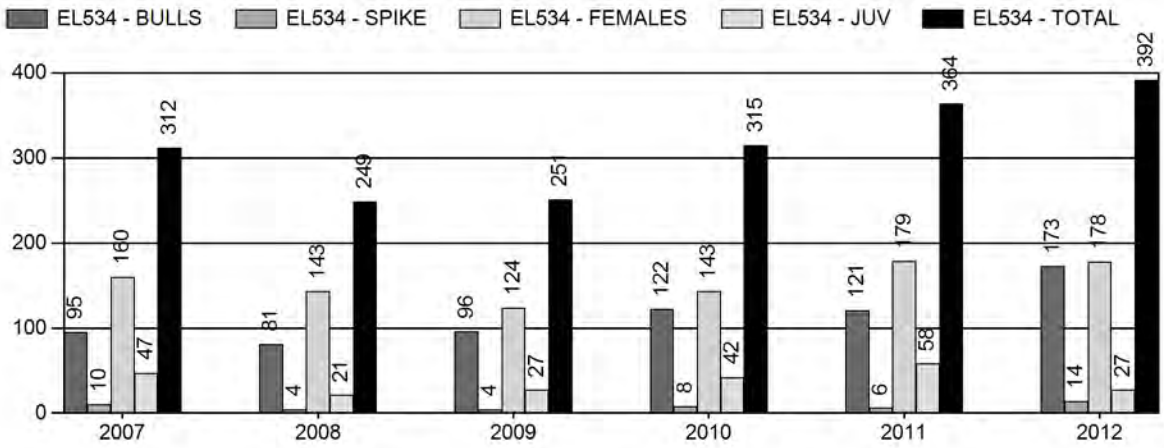
Population Objective:	800
Management Strategy:	Recreational
Percent population is above (+) or below (-) objective:	10%
Number of years population has been + or - objective in recent trend:	20
Model Date:	03/01/2013

Proposed harvest rates (percent of pre-season estimate for each sex/age group):

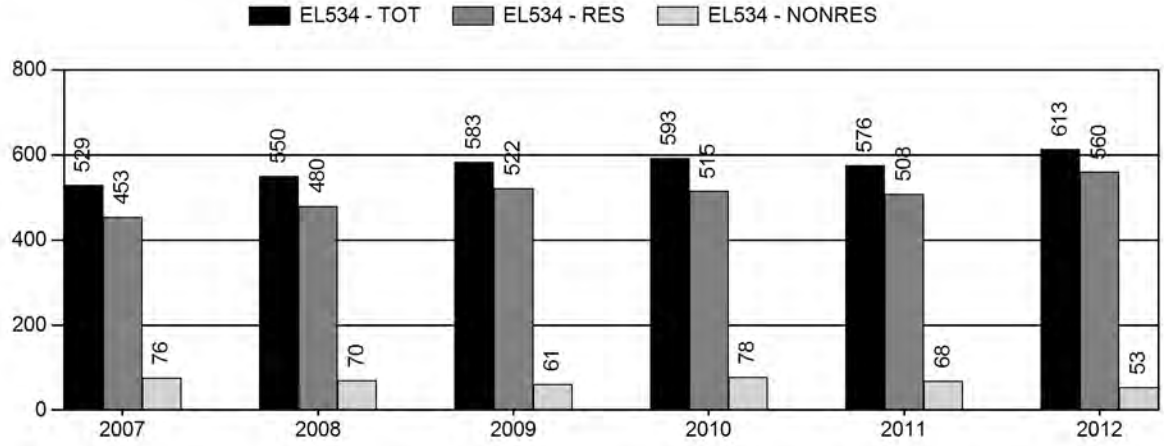
	JCR Year	Proposed
Females ≥ 1 year old:	21.4%	40.9%
Males ≥ 1 year old:	32.9%	49.3%
Juveniles (< 1 year old):	12.3%	11.6%
Total:	22.4%	33.4%
Proposed change in post-season population:	-24.7%	-36.6%



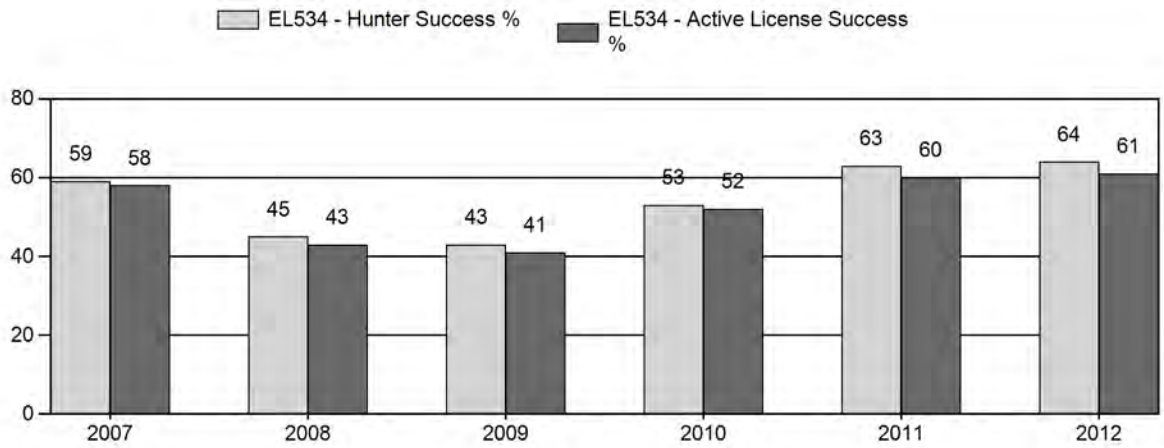
Harvest



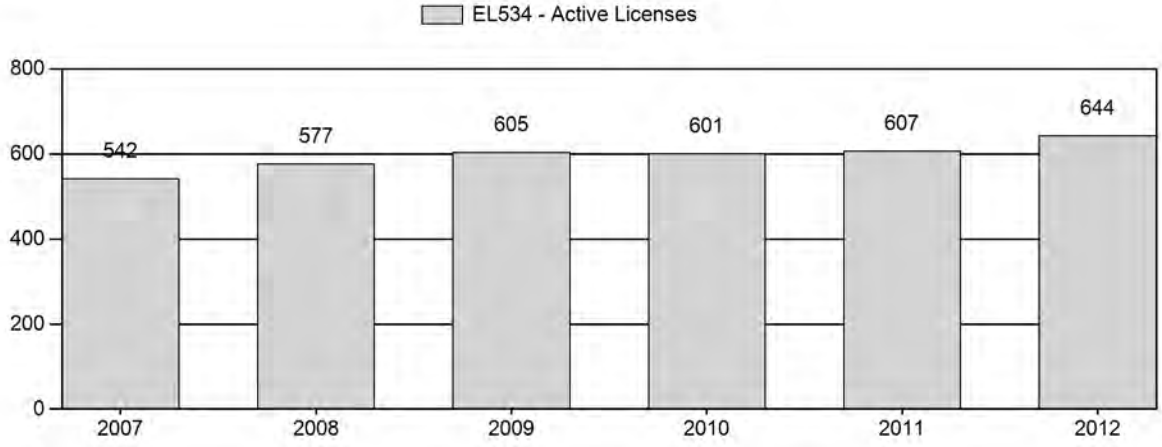
Number of Hunters



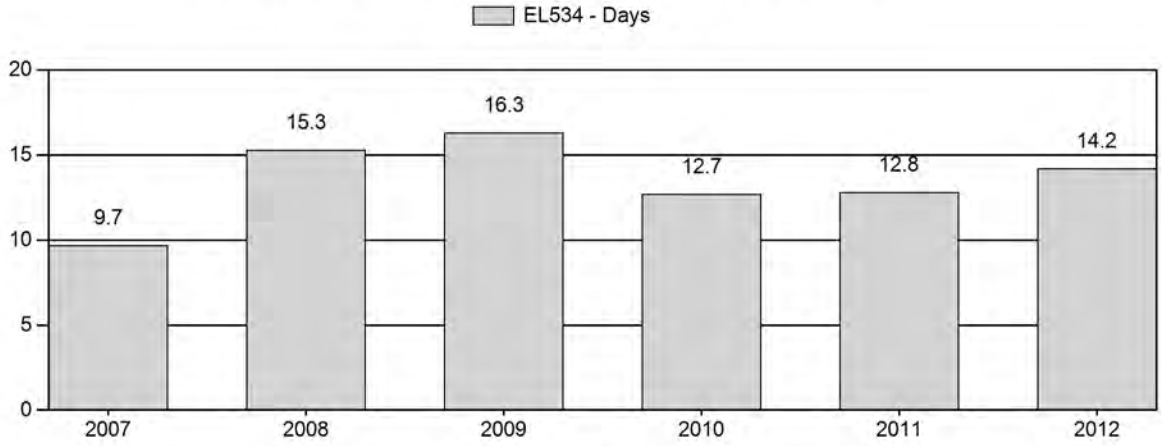
Harvest Success



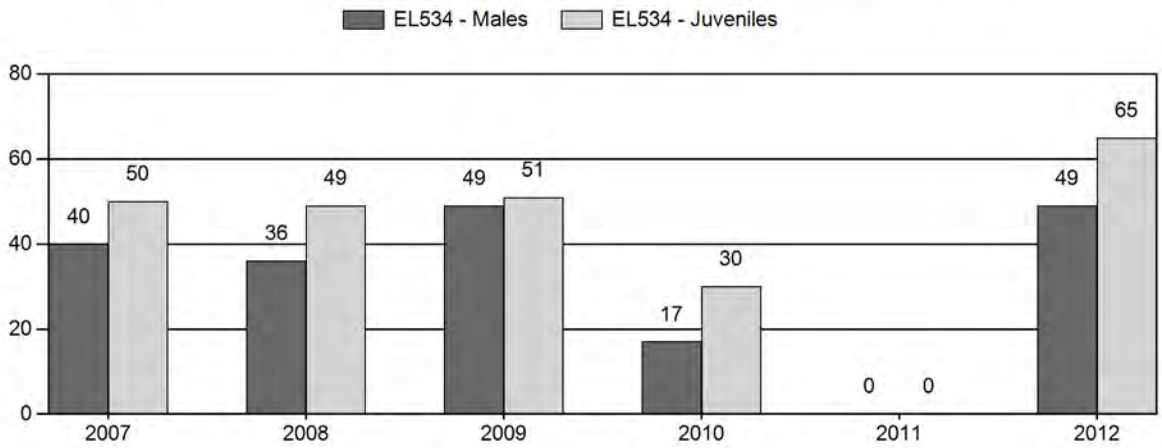
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



Shirley Mountain Elk (EL534)
Hunt Areas 16
2013 Hunting Seasons

Hunt Area	Type	Dates of Seasons		Limited Quota	Limitations
		Opens	Closes		
16	1	Oct. 1	Oct. 31	150	Limited quota licenses; any elk
	2	Nov. 1	Nov. 30	50	Limited quota licenses; any elk
		Dec. 1	Dec. 15		Unused Area 16 Type 1 and Type 2 licenses valid on the Beer Mug Hunter Management Area (HMA permission slip required)
		Jan. 15	Jan. 31		Unused Area 16 Type 1 and Type 2 licenses valid on the Beer Mug Hunter Management Area (HMA permission slip required)
	4	Oct. 1	Jan. 31	300	Limited quota licenses; antlerless elk
	6	Aug. 15	Sep. 30	200	Limited quota licenses; cow or calf valid on private land
		Oct. 1	Jan. 31		Unused Area 16 Type 6 licenses valid in the entire area

Hunt Area	Type	Quota change from 2012
	1	-50
	6	+50
Herd Unit Total	**1**	**-50**
	6	**+50**

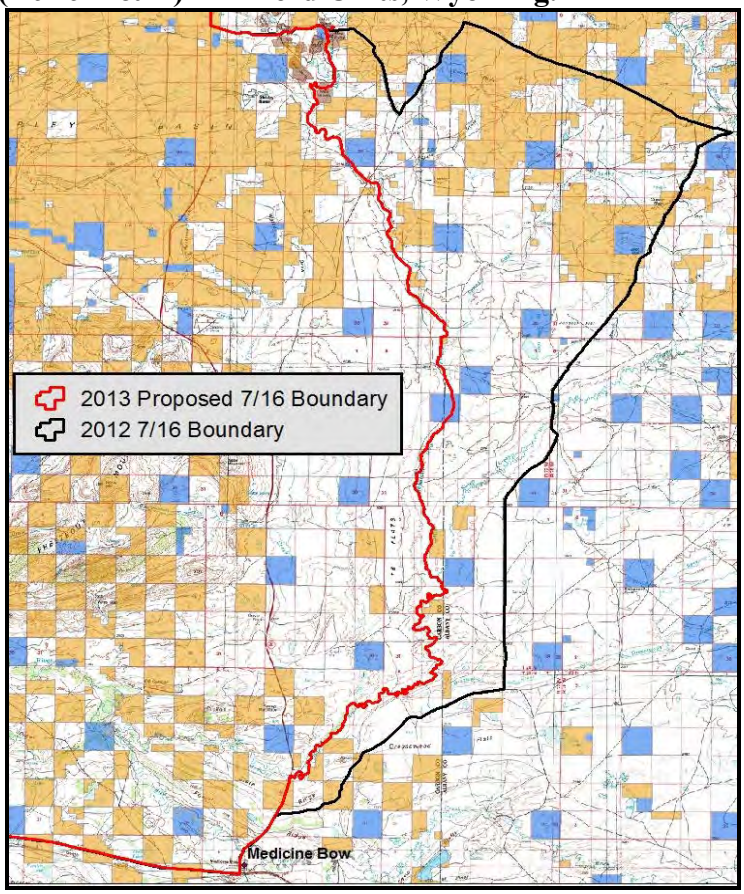
Management Evaluation
Current Management Objective: 800
Management Strategy: Recreational
2012 Postseason Population Estimate: 900
2013 Proposed Postseason Population Estimate: 600

Elk in the Shirley Mountain herd unit are managed toward a numeric objective of 800. The population was estimated using a spreadsheet model developed in 2012 and update in 2013. T he herd is managed for recreation opportunity. T he objective was last reviewed in 1997 and will be updated in 2015.

Herd Unit Issues

The University of Wyoming continued to monitor elk on the Dunlap Wind Farm on the east side of this herd unit. This wind farm is proposed to expand into more crucial winter range in the future. Elk radio-collar data from this project was used to revise the eastern boundary of the herd unit to balance the desires of landowners with the observed range for elk in this her unit (Figure 1). Our ability to manage elk numbers through harvest is difficult because a large portion of the elk habitat in this herd unit is owned by one landowner who provides only a limited amount of access. Most elk damage in this herd unit occurs on hay meadow in the northern area during the summer months.

Figure 1. 2013 Boundary change between the Shirley Mountain (*Hunt Area 16*) and Laramie Peak (*Hunt Area 7*) Elk Herd Units, Wyoming.



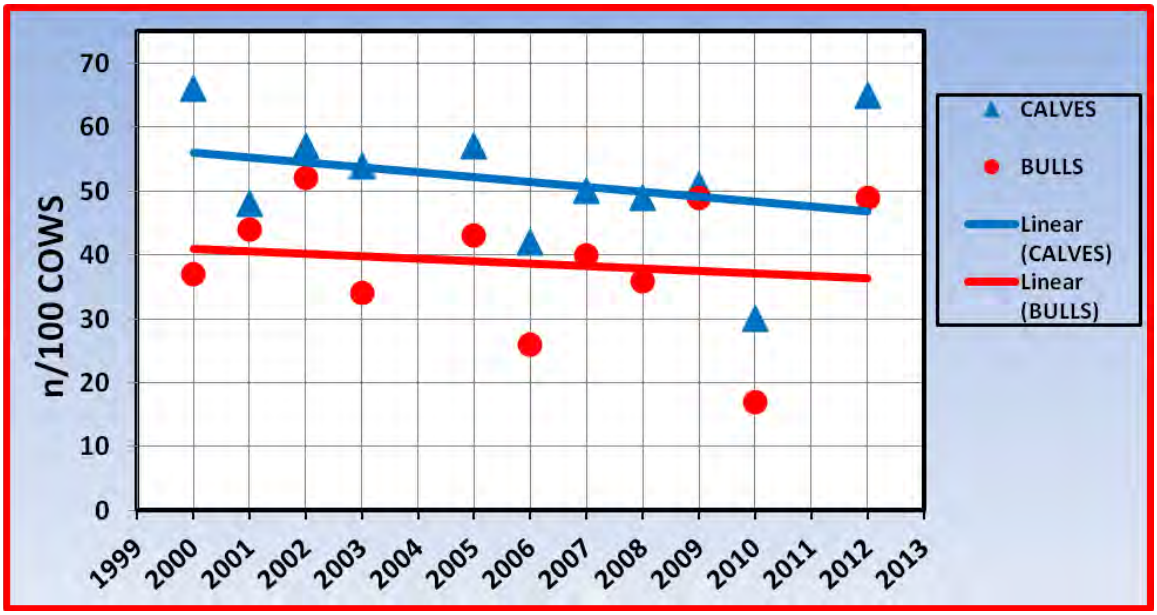
Weather

Weather in this herd unit was hot and dry during the past year. This weather pattern most likely had a negative influence on elk. For specific meteorological information for the Shirley Mountain herd unit the reviewer is referred to the following links:
http://www.ncdc.noaa.gov/temp-and-precip/time-series/
http://www.ncdc.noaa.gov/oa/climate/research/prelim/drought/pdiimage.html

Habitat
Habitat conditions declined in 2012 w ith a return to drought conditions experienced across the herd unit. No elk habitat production/utilization data was available for this herd unit. However, production was assumed to be poor and utilization high.

Field Data
The postseason classification sample of 174 elk produced ratios of 49 bulls and 65 calves /100 cows in this herd unit (Figure 1). We classified elk from a helicopter in conjunction with local mule deer classifications but we were not able to expend a lot of additional effort specifically for elk. Trend from past classifications infer this herd unit was still above the recreational management strategy maximum for bull ratios (Figure 2). The 2012 ratios were similar in trend to past ratios for this herd unit

Figure 2. Wyoming 2000-2012 Shirley Mountain Elk Herd Unit bull and calf ratio trend.



Harvest Data
Harvest survey data indicated 608 active license hunters harvested 392 elk in 2012, with an overall success rate of 65%. The 2012 harvest increased 8% from the 2011 harvest. The 2012 bull harvest (n=187) was a 32% increase over 2011. The increase in bull harvest was attributed to the new Type 2 licenses and access to private land in the Beer Mug Hunter Management Area. Antlerless harvest (n=205) decreased 14% in 2012, with no additional allocation of licenses but rather a continuation of increased season lengths.

Population
The CJ,CA model was selected to model the Shirley Mountain Herd Unit's population dynamics due to the low AIC score, simplicity, and plausible population estimate. The

data set for this herd has accuracy issues from sampling efforts and most likely this is not a closed population, all of which make it difficult to develop reliable annual population estimates.

Management Summary

Shirley Mountain Herd Unit hunting seasons are similar to last year and will continue to provide opportunities to reduce the overall elk population. Elk numbers appear near the management objective and we may need to consider reducing antlerless harvest in the not so distant future. However, given the recent return to drought conditions, competition with other ungulates, and damage issues, we consider it prudent to continue to provide opportunities to harvest elk in this herd unit. The continued operation of the Beer Mug Mountain Hunter Management Area will provide additional harvest opportunities for a limited number of elk hunters in this herd unit.

Bibliography of Herd Specific Studies

None.

2007 - 2012 Postseason Classification Summary

for Elk Herd EL534 - SHIRLEY MOUNTAIN

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Ylng	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2007	1,800	30	42	72	21%	179	53%	89	26%	340	387	17	23	40	± 6	50	± 7	35
2008	1,800	71	91	162	20%	444	54%	216	26%	822	440	16	20	36	± 3	49	± 4	36
2009	1,600	37	108	145	25%	295	50%	151	26%	591	463	13	37	49	± 5	51	± 5	34
2010	1,400	39	27	66	11%	397	68%	121	21%	584	469	10	7	17	± 2	30	± 3	26
2011	1,200	0	0	0	0%	0	0%	0	0%	0	500	0	0	0	± 0	0	± 0	0
2012	880	8	32	40	23%	81	47%	53	30%	174	0	10	40	49	± 11	65	± 13	44

INPUT	
Species:	ELK
Biologist:	SCHULTZ
Herd Unit & No.:	SHIRLEY EL534
Model date:	03/01/13

☑ Clear form

MODELS SUMMARY		Fit	Relative AICc	Check best model to create report	Notes
CJ,CA	**Constant Juvenile & Adult Survival**	123	132	☑ CJ,CA Model	
SCJ,SCA	**Semi-Constant Juvenile & Semi-Constant Adult Survival**	100	180	☐ SCJ,SCA Mod	
TSJ,CA	**Time-Specific Juvenile & Constant Adult Survival**	176	284	☐ TSJ,CA Model	
TSJ,CA,MSC	**Time-Specific Juv, Constant Adult Survival, Male survival coefficient**	61	180	☐ TSJ,CA,MSC Model	

Population Estimates from Top Model

Year	Posthunt Population Est.		Trend Count	Predicted Prehunt Population			Total	Predicted Posthunt Population			Total	Objective
	Field Est	Field SE		Juveniles	Total Males	Females		Juveniles	Total Males	Females		
1993				320	420	1075	1815	304	342	988	1634	800
1994				371	411	1045	1827	364	326	985	1675	800
1995				305	411	1057	1772	289	344	973	1606	800
1996				516	409	1026	1951	507	328	907	1742	800
1997				419	448	1016	1882	419	357	931	1706	800
1998				375	454	1017	1846	361	376	951	1688	800
1999				385	459	1022	1866	359	365	905	1629	800
2000				626	448	976	2050	609	375	923	1908	800
2001				488	520	1057	2065	481	443	999	1924	800
2002				600	555	1099	2254	574	465	1010	2050	800
2003				566	600	1134	2299	537	501	1003	2041	800
2004				484	625	1117	2226	460	514	1000	1974	800
2005				572	619	1095	2286	551	480	971	2002	800
2006				421	608	1089	2118	408	483	982	1872	800
2007				493	575	1064	2132	441	459	888	1789	800
2008				424	561	980	1965	400	467	823	1691	800
2009				424	558	907	1889	394	448	770	1613	800
2010				366	538	854	1757	320	395	696	1411	800
2011				324	467	762	1553	260	327	565	1152	800
2012				307	385	619	1311	277	180	423	880	800
2013				215	245	484	944	187	124	286	598	800
2014												800
2015												800
2016												800
2017												800
2018												800
2019												800
2020												800
2021												800
2022												800
2023												800
2024												800
2025												800

Survival and Initial Population Estimates

Year	Annual Juvenile Survival Rates			Annual Adult Survival Rates		
	Model Est	Field Est	SE	Model Est	Field Est	SE
1993	0.50			0.98		
1994	0.50			0.98		
1995	0.50			0.98		
1996	0.50			0.98		
1997	0.50			0.98		
1998	0.50			0.98		
1999	0.50			0.98		
2000	0.50			0.98		
2001	0.50			0.98		
2002	0.50			0.98		
2003	0.50			0.98		
2004	0.50			0.98		
2005	0.50			0.98		
2006	0.50			0.98		
2007	0.50			0.98		
2008	0.50			0.98		
2009	0.50			0.98		
2010	0.50			0.98		
2011	0.50			0.98		
2012	0.50			0.98		
2013	0.50			0.98		
2014						
2015						
2016						
2017						
2018						
2019						
2020						
2021						
2022						
2023						
2024						
2025						

Parameters:	Optim cells
Juvenile Survival =	0.500
Adult Survival =	0.980
Initial Total Male Pop/10,000 =	0.034
Initial Female Pop/10,000 =	0.099

MODEL ASSUMPTIONS	
Sex Ratio (% Males) =	50%
Wounding Loss (total males) =	10%
Wounding Loss (females) =	10%
Wounding Loss (juveniles) =	10%
Total Bulls Adjustment Factor	75%

Classification Counts								Harvest						
Year	Juvenile/Female Ratio			Total Male/Female Ratio									Segment Harvest Rate (% of Prehunt Segment)	
	Derived Est	Field Est	Field SE	Derived Est	Field Est w/ bull adj	Field Est w/o bull adj	Field SE	Juv	Yrl males	2+ Males	Females	Total Harvest	Total Males	Females
1993		30.77	3.52	34.58	32.00	24.00	3.03	14	23	48	79	164	18.6	8.1
1994		36.92	3.83	33.12	28.29	21.22	2.73	7	21	56	54	138	20.6	5.7
1995		29.75	5.65	35.32	30.85	23.14	4.85	14	9	52	76	151	16.3	7.9
1996		55.87	4.77	36.13	35.86	26.89	2.98	8	11	63	108	190	19.9	11.6
1997		45.00	4.26	38.30	48.89	36.67	3.73	0	18	65	77	160	20.4	8.3
1998		37.94	4.55	39.54	34.78	26.09	3.61	13	12	59	60	144	17.2	6.5
1999		39.73	3.85	40.38	54.76	41.07	3.93	23	22	63	107	215	20.4	11.5
2000		65.98	5.29	40.63	49.10	36.83	3.59	15	11	55	48	129	16.2	5.4
2001		48.19	4.15	44.34	58.80	44.10	3.91	6	9	61	53	129	14.8	5.5
2002		56.84	6.85	46.07	68.77	51.58	6.41	23	3	78	81	185	16.1	8.1
2003		53.59	6.74	49.93	45.67	34.25	5.04	26	0	90	119	235	16.5	11.5
2004		45.95	4.76	51.37	45.05	33.78	3.91	22	16	85	106	229	17.8	10.4
2005		56.72	4.70	49.43	57.71	43.28	3.93	19	10	116	113	258	22.4	11.3
2006		41.54	4.76	49.17	34.87	26.15	3.56	12	8	106	98	224	20.6	9.9
2007		49.72	6.45	51.75	53.63	40.22	5.61	47	10	95	160	312	20.1	16.5
2008		48.65	4.04	56.75	48.65	36.49	3.35	21	4	81	143	249	16.7	16.0
2009		51.19	5.12	58.14	65.54	49.15	4.99	27	4	96	124	251	19.7	15.0
2010		45.95	4.76	56.66	45.05	33.78	3.91	42	8	122	143	315	26.6	18.4
2011		45.95	4.76	57.81	45.05	33.78	3.91	58	6	121	179	364	29.9	25.8
2012		65.43	11.56	42.43	65.84	49.38	9.54	27	14	173	178	392	53.4	31.6
2013		65.43	11.56	43.44	65.84	49.38	9.54	25	10	100	180	315	49.3	40.9
2014														
2015														
2016														
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2020														
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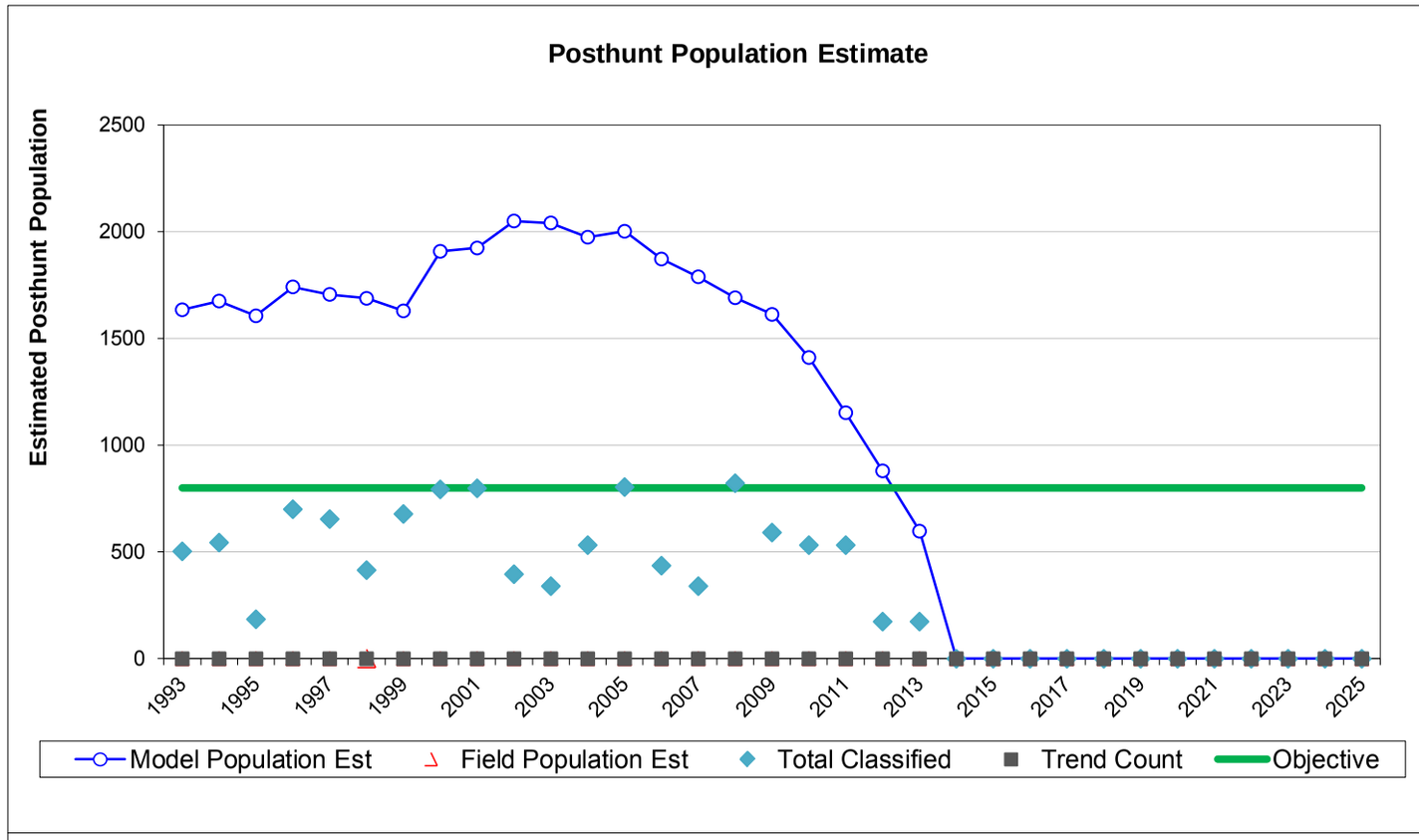
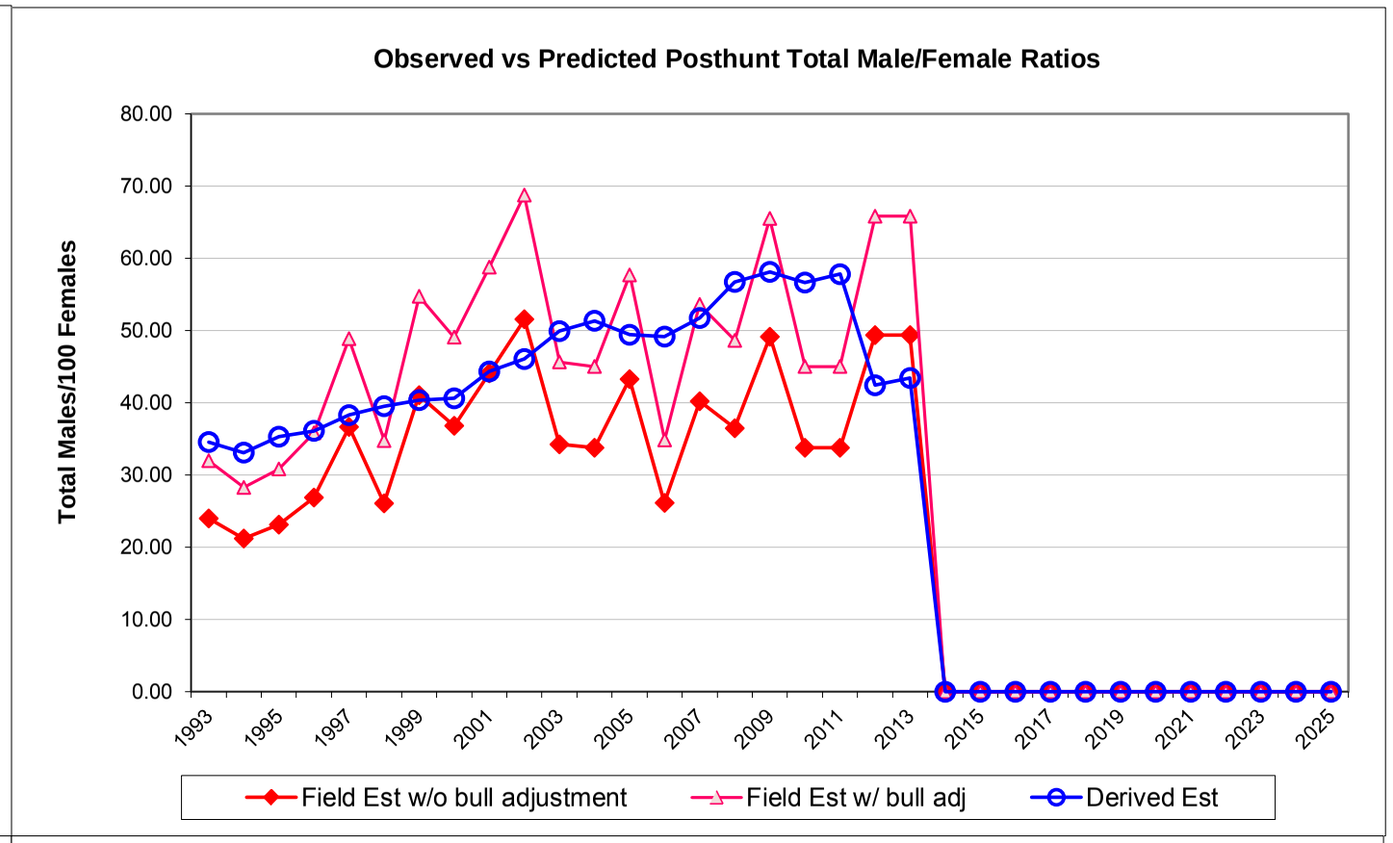
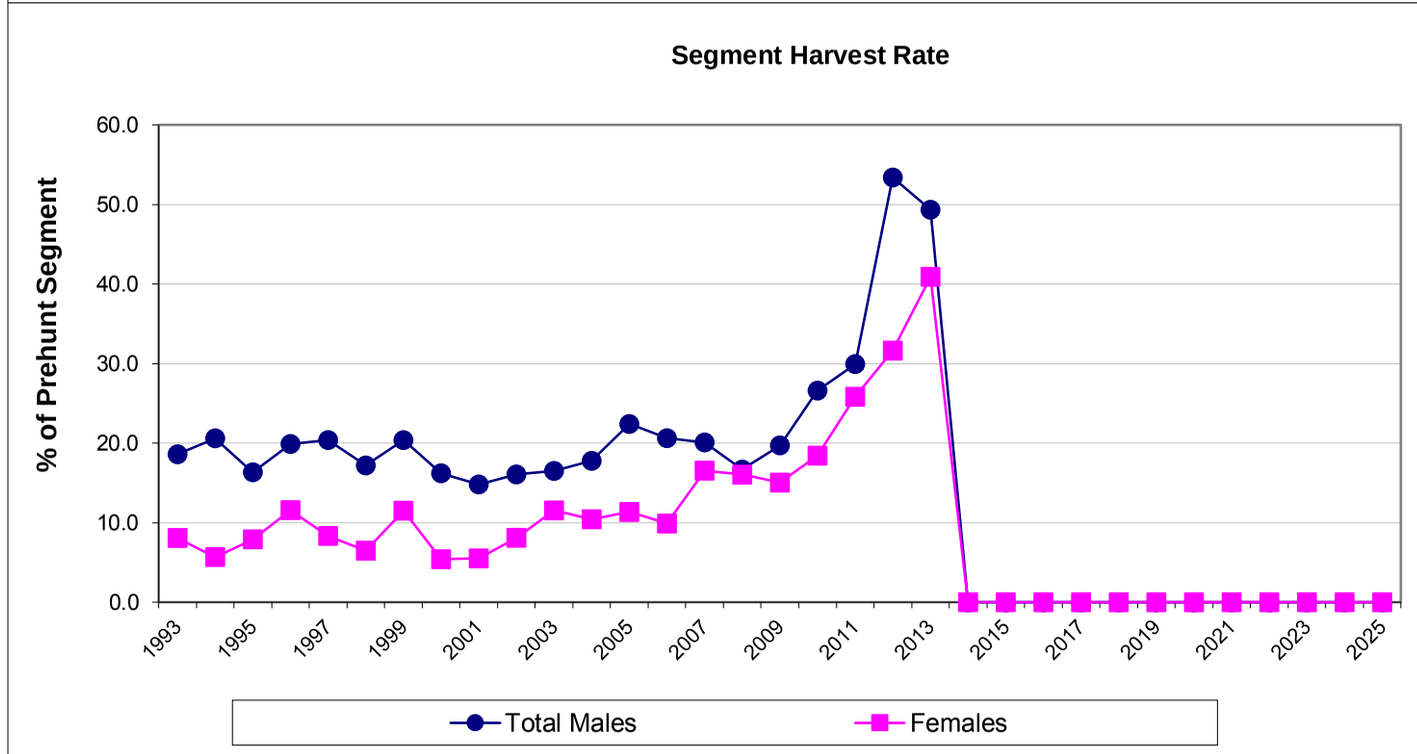
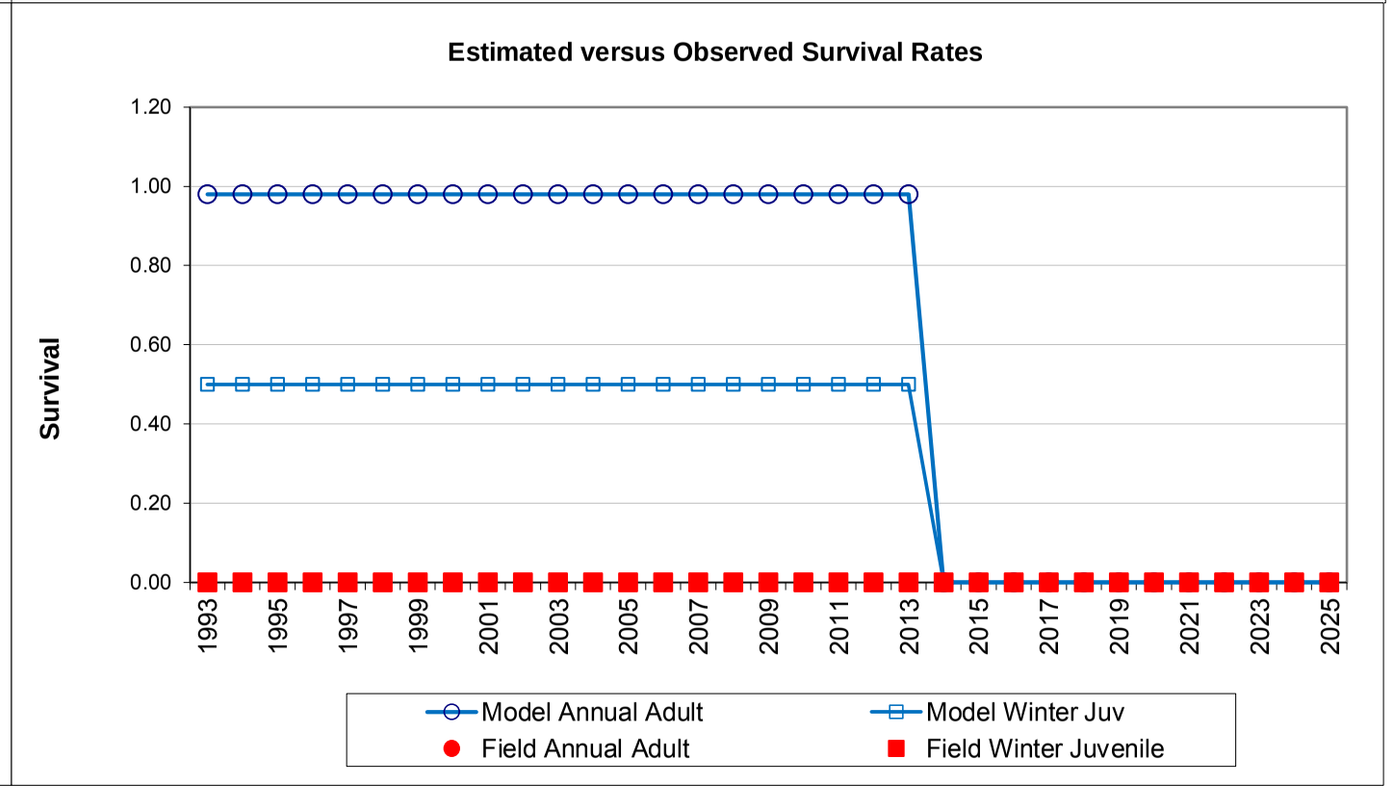
FIGURES





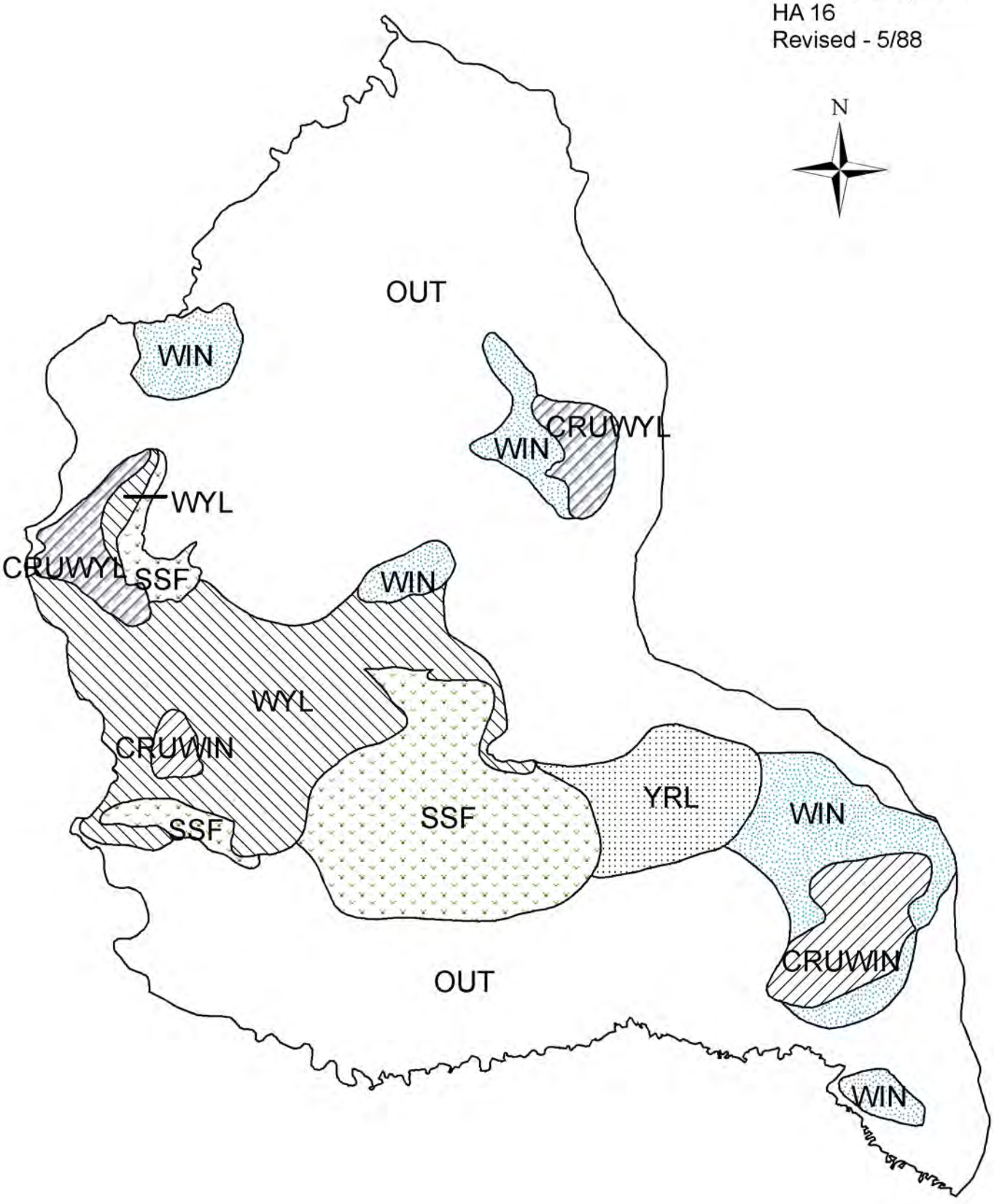




Comments:

The CJ,CA model was selected for 2012 due to the low AICc score, simplicity, and plausible population estimate.. The data set for this herd has accuracy issues and most likely there has been interchange occurring with surrounding herd units, all of which make it difficult to develop reliable annual population estimates.

END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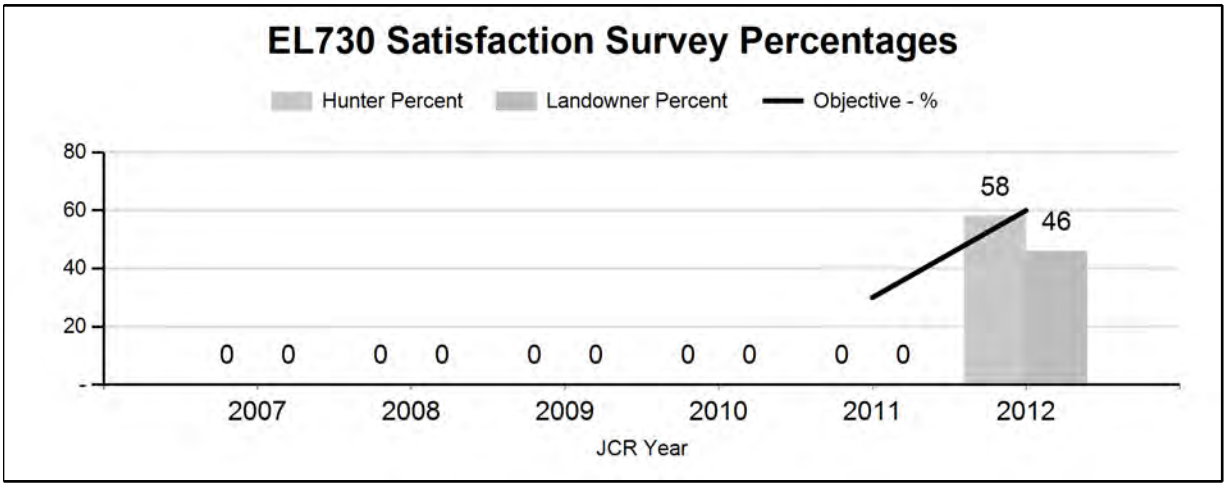
2012 - JCR Evaluation Form

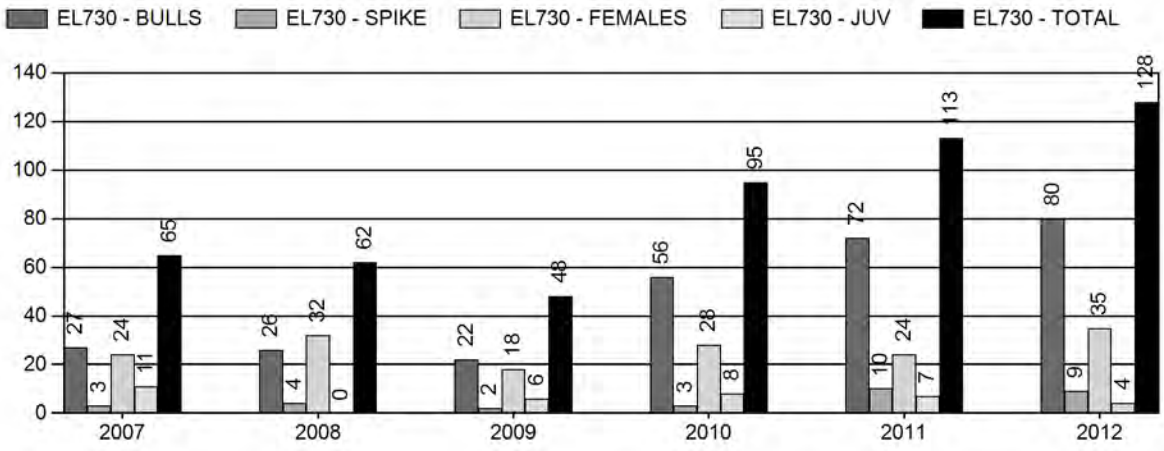
SPECIES: Elk
HERD: EL730 - RAWHIDE
HUNT AREAS: 3

PERIOD: 6/1/2012 - 5/31/2013
PREPARED BY: MARTIN HICKS

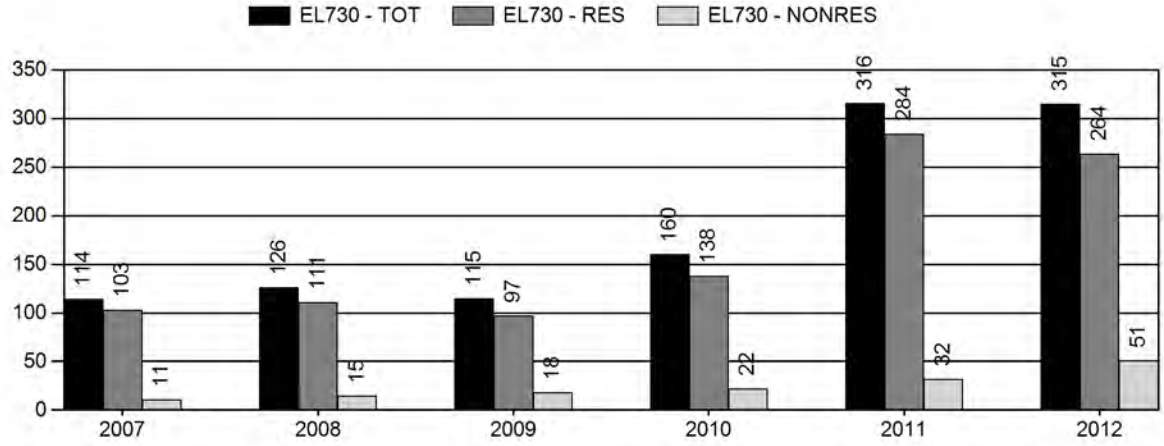
	2007 - 2011 Average	2012	2013 Proposed
Hunter Satisfaction Percent	0%	58%	60%
Landowner Satisfaction Percent	0%	46%	60%
Harvest:	77	135	150
Hunters:	166	325	375
Hunter Success:	46%	42%	40%
Active Licenses:	179	40%	385
Active License Percentage:	43%	40%	39%
Recreation Days:	1,591	2,022	2,220
Days Per Animal:	20.7	15.0	14.8
Males per 100 Females:	70	0	
Juveniles per 100 Females	58	0	
Satisifaction Based Objective			60%
Management Strategy:			Special
Percent population is above (+) or (-) objective:			-8%
Number of years population has been + or - objective in recent trend:			0



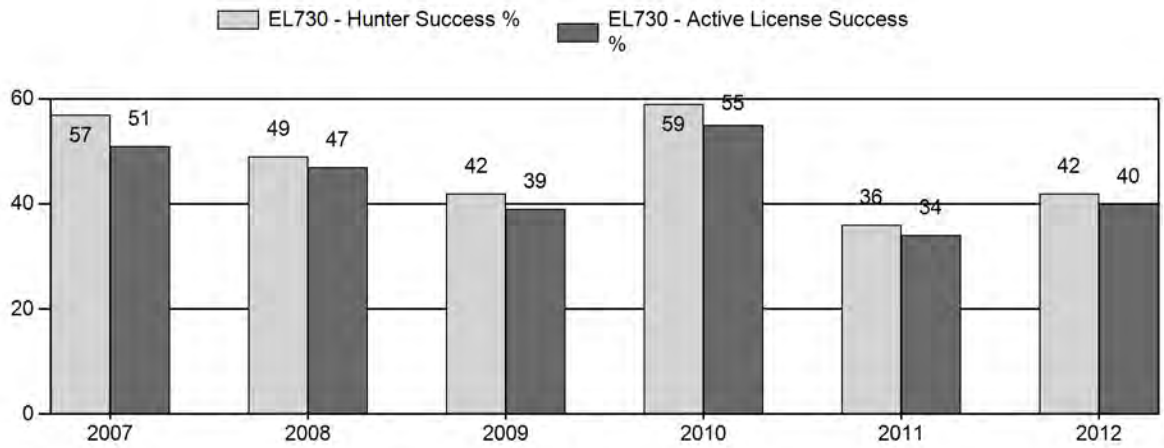
Harvest



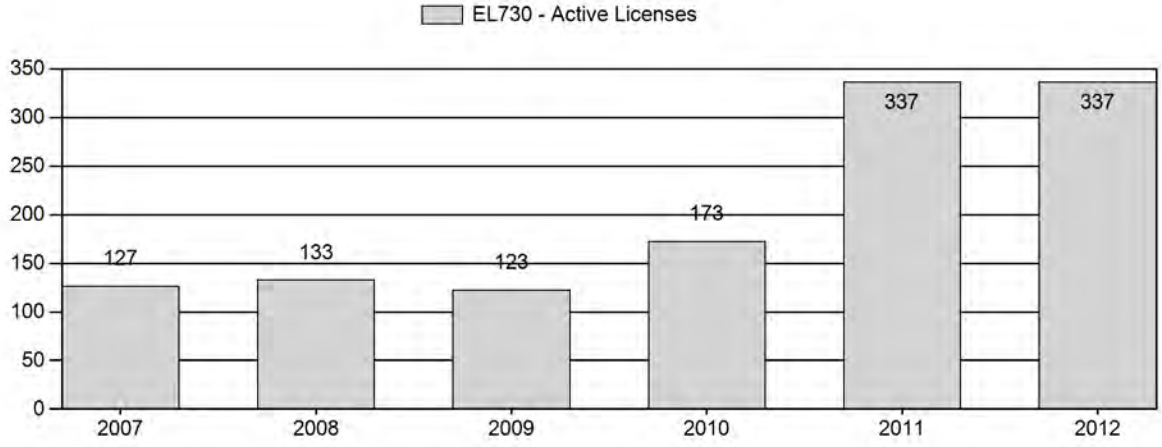
Number of Hunters



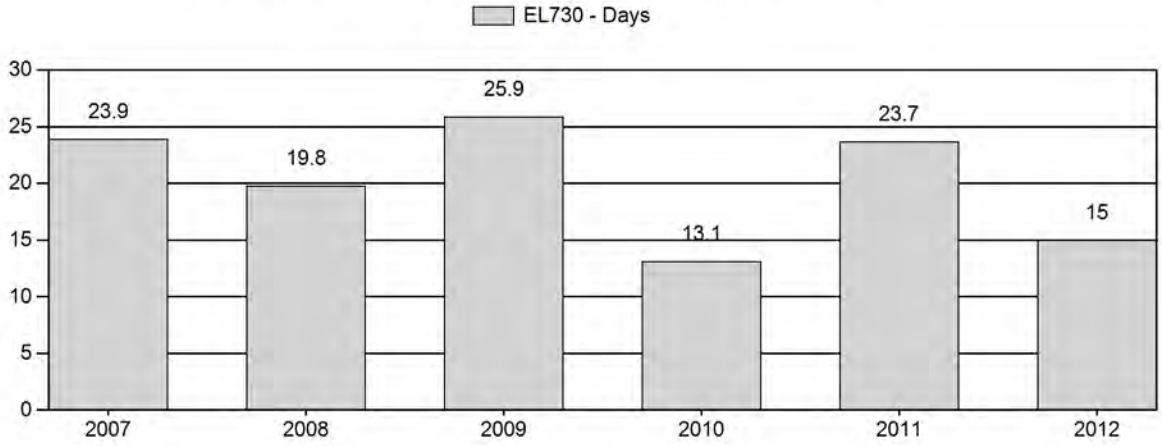
Harvest Success



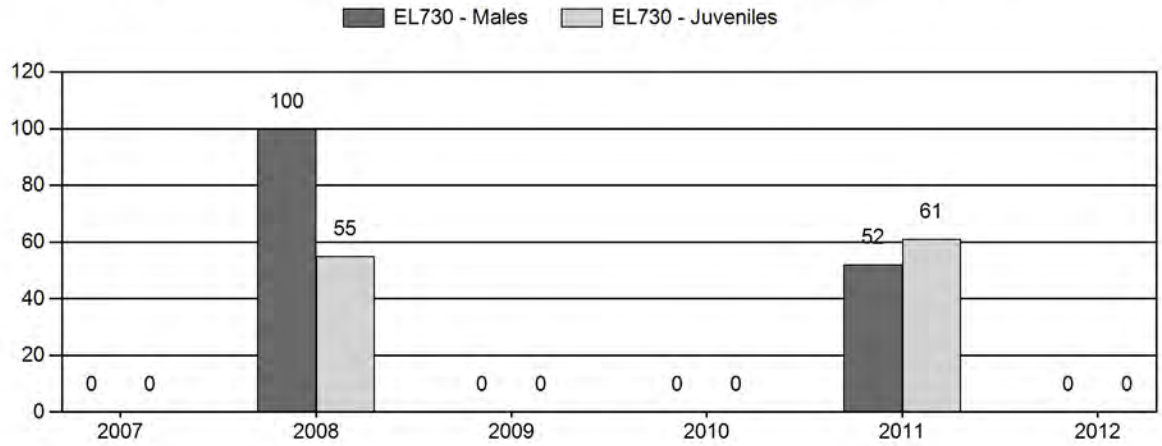
Active Licenses



Days per Animal Harvested



Postseason Animals per 100 Females



2007 - 2012 Postseason Classification Summary

for Elk Herd EL730 - RAWHIDE

		MALES				FEMALES		JUVENILES				Males to 100 Females				Young to		
Year	Post Pop	Ylg	Adult	Total	%	Total	%	Total	%	Tot Cls	Cls Obj	Yling	Adult	Total	Conf Int	100 Fem	Conf Int	100 Adult
2007	0	0	0	0	0%	0	0%	0	0%	0	0	0	0	0	± 0	0	± 0	0
2008	0	5	15	20	39%	20	39%	11	22%	51	0	25	75	100	± 0	55	± 0	28
2009	0	0	0	0	0%	0	0%	0	0%	0	0	0	0	0	± 0	0	± 0	0
2010	0	0	0	0	0%	0	0%	0	0%	0	0	0	0	0	± 0	0	± 0	0
2011	0	3	14	17	24%	33	47%	20	29%	70	0	9	42	52	± 0	61	± 0	40
2012	0	0	0	0	0%	0	0%	0	0%	0	0	0	0	0	± 0	0	± 0	0

2013 HUNTING SEASONS
RAWHIDE ELK HERD (730)

Hunt Area	Type	Dates of Seasons Opens	Closes	Quota	Limitations
3		Aug. 15	Jan. 31		General license; any elk valid south of U.S. Highway 26.
	1	Sep. 15	Oct. 14	75	Limited quota licenses; any elk
	4	Sep. 15	Oct. 14	50	Limited quota licenses; antlerless elk
	6	Sep. 15	Oct. 14	75	Limited quota licenses; cow or calf
		Nov. 1	Jan. 31		Unused Area 3 Type 1, Type 4, and Type 6 licenses valid for antlerless elk
Archery		Sep. 1	Sep. 14		Refer to Section 3 of this Chapter

Hunt Area	Type	Quota change from 2012
3	1,4,6	No change

Management Evaluation

Current Management Objective: 1) Landowner and hunter satisfaction; Target goal: ≥ 60% 2) Male "quality"; Target goal: ≥ 61% branch antlered bulls in harvest survey

2012 Post-season Objective Results: 1) 57% either satisfied or very satisfied, 2) 90% branch antlered bulls

2013 Post-season Results: Unknown

Herd Unit Issues

The management objective was changed in 2012 from a post-season population objective of 40 elk to a nonnumeric population objective based on landowner and hunter satisfaction and the percentage of branch antlered bulls in the harvest. The management strategy was also changed from recreational to special. We will follow trends over time to make management decisions based on constituent satisfaction and bull harvest parameters. There is not a working model for this herd unit due to our inability to collect adequate population data.

This herd unit has been difficult to manage based on our inability to collect adequate herd composition data along with field harvest data and as a result there is not a reliable working model. Over 80% of the land is privately owned. Based on field personnel and landowner observations we estimate there are over 400 elk in the Rawhide Elk Herd, with the population expanding south of the North Platte River into Goshen, Platte and Laramie Counties. There have been several public meetings to address the increasing population, and as a result the herd boundary was expanded south to the Colorado border for the 2012 season. In addition that portion of Area 3 south of U.S. Highway 26 was changed to a general season with a liberal season length from Aug 15 to January 31. Management goals for that portion of the herd are to

prevent elk from expanding south and to try and remove and or push elk back north of the North Platte River.

Weather

Weather during 2012 and into 2013 was extremely dry and warmer than normal. Portions of Southeast Wyoming received little summer precipitation. The winter of 2012-13 has been mild with little snow fall. There have been periods of below normal temperatures but then they swing back to days > 50 degrees Fahrenheit. Ungulates went into the winter in poor body condition as a result of the drought above normal winter mortality could occur if normal or above average winter conditions exist from March to May. The spring/summers of 2010 and 2011 received above normal precipitation that most likely resulted in above calf to cow. Due to our inability to annually collect adequate classification there is not a reliable calf ratio estimate. Compared to the Laramie Peak elk herd, ratios run around 40 calves: 100 cows. However, the winter of 2010 experienced above normal precipitation with high snowpack resulting in poor over winter survival. The winter of 2011 was normal within this geographic area. Refer to the following websites for weather data: http://www.ncdc.noaa.gov/temp-and-precip/time-series/ and http://www.ncdc.noaa.gov/oa/climate/research/prelim/drought/pdiimage.html.

Habitat

There are no established habitat transects for this herd unit. Recent fire activity in 2012 and 2010 burned over 20,000 acres will likely improve elk habitat by reducing competition from encroaching conifers on perennial grasses and forbs, key elk forage. . The reader is referred to the 2012 Strategic Habitat Plan Annual Report for additional habitat information within the Laramie Region (http://wgfd.wyo.gov/web2011/Departments/Wildlife/pdfs/SHP12_AR_LARAMIEREGION0004110.pdf).

Field/Harvest Data

Harvest success and effort have fluctuated the past five years, but when the 2012 harvest data is compared to the five-year average there is not much difference. Finding elk in this herd unit can be difficult due to landownership patterns. The limited number of licenses available north of the North Platte River hunters must have secured access or they will have a hard time harvesting an elk. Success south of the Platte River is dependent upon elk distribution. The majority of landowners do not want elk in that area and are willing to allow access. In 2011 elk were plentiful and hunters were successful. In 2012 the severe drought displaced elk and were not found in traditional places (i.e. alfalfa fields). They did start using corn fields south of Ft. Laramie, but harvest was not possible until harvest was over, by then they moved on.

Licenses numbers have fluctuated from 50 to 200 over the years. Starting in 2001 that portion of Hunt Areas 3 south of U.S. Highway 26 became a general season. Hunter numbers were 145 in 2011 and 160 in 2012. Hunters harvested 45 elk in 2011 and 60 elk in 2012. It appears elk numbers continue to increase in that portion of the hunt area and harvest strategies are to reduce that segment of the population. The northern portion of the herd unit provided traditional elk seasonal ranges. Based on landowner comments there is a split on how this herd should be managed. About half want more elk and the other half want fewer elk. As a result we provide what appears to be a reasonable number of any elk and antlerless elk licenses. The five-year harvest average is 46% and effort is 20 days per harvest. The 2012 harvest data is similar to the five-year average. Harvest is driven by access and if hunters are limited to public land, success

decreases and effort increases. Field or classification data was not collected in 2012 since the objective was changed from a numeric number to a satisfaction survey.

Landowner/Hunter Satisfaction Survey Results

The hunter satisfaction survey showed that 57% of the hunters were either satisfied or very satisfied and 21% were neutral. Only 20% were dissatisfied or very dissatisfied with their quality of hunt. Based on limited conversations from hunters in the field there was concern over finding elk. However, the majority of the complaints came from hunters that were trying to hunt the limited public land. The landowner satisfaction survey showed that 47% of the landowners were satisfied or very satisfied, 29% were neutral and 24% were either dissatisfied or very dissatisfied. We feel that the return rate of surveys (73%) from landowner was adequate enough to validate the confidence in the survey. Hunters satisfaction was just slightly below the target range of 60% but it is obvious landowners are not satisfied with the elk herd with the same target range of 60%. Based on return comments there were numerous reasons for their dissatisfaction: 1) damage, 2) no elk during the hunting season, 3) want a general season north of Highway 26, 4) fires displaced elk and 5) landowners do not want elk south of Highway 26. The percent of branched antlered bulls in the survey was 90%. Our ability to manage this segment of the population is limited due to access and it will likely remain high.

Management Summary

In summary the 2013 season is designed to reduce elk numbers south of the North Platte River. North of the river will continue to be managed for limited opportunity for bulls while at the same time long seasons for average cow harvest. It is our hope to limit the amount of damage south of the Platte River with an early season structure. With the extended general season we hope to attain a harvest of around 150 elk.

Rawhide Elk Herd Unit(E730)